federal register

THURSDAY, JUNE 10, 1976

PART III:

ENVIRONMENTAL PROTECTION AGENCY

WATER PROGRAM

■

Proposed Toxic Pollutant Effluent Standards

ENVIRONMENTAL PROTECTION AGENCY

[40 CFR Part 129]

[FRL 551-7]

WATER PROGRAM

Proposed Toxic Pollutant Effluent Standards

1. Notice is hereby given that the Environmental Protection Agency, pursuant to the authority contained in section 307 (a) of the Federal Water Pollution Control Act (the Act) as amended by the Federal Water Pollution Control Act Amendments of 1972 (Pub. L. 92-500, 86 Stat. 816, (33 U.S.C. § 1251 et seq.)), proposes a new Part 129, setting forth proposed effluent standards for certain toxic pollutants included on a list of toxic pollutants previously published by the Agency pursuant to section 307(a)(1), 38 FR 24342 et seq. (September 7, 1973). This list and matters relating thereto are discussed below.

Section 307(a)(2) of the Act provides as follows:

> Within one hundred and eighty days after the date of publication of any list, or revision thereof, containing toxic pollutants or combination of pollutants under paragraph (1) of this subsection, the Administrator, in accordance with section 553 of title 5 of the United States Code, shall publish a proposed effluent standard (or prohibition) for such pollutant or combination of pollutants which shall take into account the toxicity of the pollutant, its persistence, degradability, the usual or potential presence of the affected organisms in any waters, the importance of the affected organisms and the nature and extent of the effect of the toxic pollutant on such organisms, and he shall publish a notice for a public hearing on such proposed standard to be held within thirty days. As soon as possible after such hearing, but not later than six months after publication of the proposed effluent standard (or prohibition), unless the Administrator finds, on the record, that a modification of such proposed standard (or prohibition) is justified based upon a preponderance of evidence adduced at such hearings, such standard (or prohibition) shall be promulgated.

The regulations proposed at this time establish effluent standards for manufacturers and formulators, both existing and new sources, for the toxic pollutants listed below:

1. Aldrin and dieldrin (These substances are treated together because of their close chemical relationship, and from time to time are referred to collectively as "aldrin/dieldrin").

2. DDT, DDD and DDE. (These substances are from time to time referred to collectively as "DDT" or "DDT and its metabolites").

3. Endrin.

4. Toxaphene.

The following, together with the materials and information hereinafter referred to and incorporated by reference, sets forth the basis and purpose of the effluent standards proposed in this Part.

SUMMARY OF PRINCIPAL FEATURES AND BENEFITS OF THE PROPOSED REGULATIONS

The regulations here proposed would establish effluent standards for all manufacturers and formulators of any of the following four toxic pollutants who discharge directly into the navigable waters: aldrin/dieldrin, DDT (DDE, DDD), endrin and toxaphene. Standards are established for both existing sources and new sources. Manufacturers and formulators who discharge into publicly owned treatment works, as defined in section 212 of the Act, are not covered by the standards herein proposed. However, the Agency expects to propose pretreatment standards for such indirect dischargers pursuant to the authority contained in section 307 of the Act in due course.

The four toxic pollutants covered in this proposed rulemaking are among the nine toxic pollutants listed for control by the Agency pursuant to section 307(a)(1) on September 7, 1973. They are among the most highly toxic pesticides known to man. All four have been clearly shown to result in lethal and sublethal toxic effects at low dose levels upon a wide range of fish, birds, mammals, and other wildlife, and have also demonstrated serious adverse health effects to man. Moreover, all four pollutants are highly mobile and persistent in the environment, and have demonstrated particular harm to aquatic organisms, in which they bioaccumulate greatly. Aldrin/dieldrin and DDT have previously been found by the Administrator to pose a cancer threat to man and accordingly most registered uses of them have been cancelled under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), as discussed more fully below.

Although manufacture and formulation of these pesticides are presently somewhat limited, the potential for export sales as well as domestic uses makes it reasonable to expect that these substances will continue to be manufactured and formulated. This in turn poses the prospect of continued aqueous discharge and resulting environmental contamination, hence the need for controls under section 307(a) of the Act.

The proposed standards would require no aldrin/dieldrin or DDT (DDE, DDD) in any discharge from new or existing manufacturers or formulators of these substances. For endrin and toxaphene the proposed standards for existing manufacturers in terms of concentration and weight respectively are 1.5 μg/1 and 0.0003 kg/kkg of endrin produced, and 1.5 μg/1 and 0.00001 kg/kkg of toxaphene produced. A more stringent standard is proposed for new manufacturing sources. Both substances are prohibited in the discharges from formulators. Data available to the Agency indicate that these standards will provide the degree of protection for aquatic and other organisms and human health required by the Act, and are technologically achievable by industry without serious adverse economic or environmental impacts.

In the interest of complete coverage, the Agency has incorporated into its definition of pesticide manufacturers both those owners and operators who manufacture the pesticides and those owners or operators who use such pesticides as an input constituent in manufacturing another product. The Agency is unaware of any such subsequent manufacturing uses of these four pesticides by any owner or operator who directly discharges to a navigablye water (although one such manufacturing operation has been identified where the waste is introduced into a publicly owned treatment works). The Agency hereby solicits any information concerning such subsequent manufacturing use of these pesticides including information such as the identification of such owners' or operators, the pesticide being so used, the final product, suitability of substitute non-pesticidal input materials, the characterization of wastewaters produced, and the availability and effectiveness of any known waste treatment technology.

I. BACKGROUND

A. PRIOR REGULATORY ACTION UNDER SECTION 307(a)

On July 6, 1973, the Agency published in the FEDERAL REGISTER a proposed list of nine toxic pollutants pursuant to section 307(a)(1) of the Act, 38 FR 18044. The nine substances were: aldrin/dieldrin, benzidine, cadmium, cyanide, DDT (DDD, DDE), endrin, mercury, polychlorinated biphenyls, and toxaphene. Following receipt of public comment, the list was promulgated on September 7, 1973, together with a discussion of the Agency's selection criteria and a response to comments received on the proposed list, 38 FR 24342 et seq. The promulgated list consisted of the same nine substances previously proposed.

On December 27, 1973, the Agency published proposed toxic pollutant effluent standards for each of these nine substances, together with a summary of the factors considered in setting the standards, and a list of point source categories of dischargers proposed for coverage, 38 FR 35388 et seq. As recited in that notice of proposed rulemaking, the standards proposed therein were developed under severe time constraints imposed by court order in response to litigation commenced by the Natural Resources Defense Council, *NRDC* v. *Fri*, Civ. Action No. 849-73 (D.D.C. June 19, 1973, as modified), with the result that the Agency had not had time to develop data in certain areas. In accordance with section 307(a)(2) of the Act, a formal rulemaking hearing on the proposed standards was scheduled.

A prehearing conference was held on January 25, 1974, followed by a 30-day evidentiary hearing during April and May. Thirty-eight objecting parties participated, most of whom were industries or industry associations who would be affected by the proposed standards. During these hearings industry objectors introduced evidence which tended to show the following problems:

(1) Questions were raised as to whether the technology existed to monitor and detect the presence of some of the toxic pollutants in effluents at the low levels of concentration prescribed in the proposed standards with any degree of accuracy or reliability.

(2) The proposed standards were based in part upon certain hydrological considerations, including the flow rate and volume of rivers, and the propensity of a pollutant to disperse following discharge and become less concentrated in the area in the immediate vicinity of the discharge (substantially the equivalent of a "mixing zone"). It was argued that these assumptions were oversimplified, and evidence was presented indicating that attempts in the proposed standards to prescribe different discharge levels based upon flow rates and volumes of the receiving waters could result in unrealistic and unfair discrimination among dischargers, as well as major administrative problems. No evidence was submitted to indicate a reasonable alternative approach.

(3) The standards for each substance included a provision for allowable discharges based upon a conservative seven day "low flow" of the water body for a recurrence frequency of ten years. The low flow for an estuary was defined in § 129.01(c) of the proposed standards as the low flow of its tributaries. Evidence was submitted that many major estuaries have no tributaries, with the result that allowable discharge for industries located on them would be zero. Time constraints did not allow for the correction of this problem prior to the conclusion of the hearing.

(4) Many industries presented evidence to show that the technology available to them either could not achieve the proposed effluent limitation levels, or could not be installed within the one-year compliance time contained in the statute (cf. § 307(a)(6) and 307(d)). Other industries presented evidence to show that even where such control technology might be available, it could only be installed at very substantial expense. Further evidence was introduced to show that promulgation of the proposed standards would force large segments of major American industries to shut down. No evidence was available in the record by which to test the validity or strength of these claims.

In addition, there were some gaps in the Agency's data concerning the identification and extent of point source discharge of the substances. This in turn affected the Agency's ability to promulgate standards for the range of point sources proposed for coverage.

B. THE DECISION TO GATHER ADDITIONAL DATA AND REPROPOSE

Following the completion of these hearings, which had proceeded within the extremely short 6-month time frame following proposal of standards as prescribed in section 307(a)(2), the Agency concluded that because of the problems and data gaps in the hearing record referred to above it could not promulgate responsible and defensible standards based upon that record. This is not to say that the effluent standards originally proposed by EPA are indefensible, but rather to emphasize that at the time of the hearing on those proposed standards, the Agency did not have available to it the necessary data to fully substantiate the proposed standards or to respond effectively to the problems raised by the objectors. The status of the hearing record is critical, because under sections 307(a)(2) and (3) it is the sole basis for the promulgation of final standards, and the hearing record on the proposed toxic standards revealed that those standards could not be defended based on its contents.

At the same time the Agency was deeply concerned with the fact that it was then behind the time schedule which Congress prescribed for the setting of standards under section 307(a), and that to take the time to gather additional data would cause the Agency to fall further behind that timetable. The result was one apparently not anticipated by Congress at the time section 307(a) was drafted, namely, that the hearing record, though voluminous, did not contain sufficient evidence upon which defensible standards could be promulgated. The proposed standards could not be defended on the record, and no specific modification could be "justified based upon a preponderance of evidence adduced at the hearings" (section 307(a)(2)).

Faced with the choice between (a) promulgating standards on an insufficient record which were subject to almost certain challenge in court with the likely result of protracted litigation followed by a remand, or (b) taking the time to gather additional data to fill the gaps and make a fresh proposal, the Agency has elected the latter course as the more responsible. The Agency believes that the purpose of the Act is better served by proposing responsible and defensible standards, though late, than by rushing to meet a timetable which experience has shown to be too optimistic.

The permissibility of deferring regulatory action beyond the statutorily prescribed deadline was recognized by the U.S. Court of Appeals for the District of Columbia Circuit in allowing EPA to exceed certain statutory deadlines for issuing its effluent limitations guidelines and new source performance standards under the Act when resource constraints so dictated, *Natural Resources Defense Council* v. *Train*, 510 F. 2d 692 at 712–713 (D.C. Cir. 1975):

> The Act contemplates that the Agency's guidelines will be defensible if attacked by polluters seeking to avoid the effluent limitations. We perceive two types of constraints which might delay the formulation of adequate guidelines for some few categories of point sources beyond the deadline established by the Act. First, it is possible that budgetary commitments and manpower demandes required to complete the guidelines by December 31 are beyond the Agency's capacity or would unduly jeopardize the implementation of other essential programs. Second, EPA may be unable to conduct sufficient evaluation of available control technology to determine which is the best practicable or may confront problems in determining the components of particular industrial discharges. The courts cannot responsibly mandate flat guideline deadlines when the Administrator demonstrates that additional time is necessary to insure that the guidelines are rooted in an understanding of the relative merits of available control technologies. The delay required to give meaningful consideration to the technical intricacies of promising control mechanisms may well speed achievement of the goal of pollution abatement by obviating the need for time-consuming corrective measures at a later date.

Other judicial authority exists as well as for the Agency to deviate from the timetable in section 307(a) when such deviation will result in actions that will better serve the goals of the Act, e.g., *Commonwealth of Pennsylvania* v. *Lynn*, 501 F. 2d 848 (D.C. Cir. 1974). Moreover, the courts have not hesitated to reject and remand for further Agency consideration regulations promulgated on an inadequate record, e.g., *Portland Cement Association* v. *Ruckelshaus*, 488 F. 2d 375, 393 (D.C. Cir. 1973).

Since the 1974 hearing a number of measures have been taken by the Agency to remedy the problems elicited at that hearing and to provide the data base necessary for standards under section 307(a). The results of these efforts, insofar as they relate to the four substances for which standards are proposed at this time, are discussed more fully below. The principal areas of data gathering are briefly identified as follows:

First, the Agency has substantially expanded its data base with respect to the toxicity and environmental behavior and effects of the substances. This is in accord with the language of section 307(a) which requires the Administrator, both in the selection of substances and in the publication of standards, to consider "the toxicity of the pollutant, its persistence, degradability, the usual or potential presence of the affected organisms in any waters, the importance of the affected organisms and the nature and extent of the effect of the toxic pollutant on such organisms. * * *"

The data include human health efforts to the extent available. Although human beings are not enumerated in section 307(a) among the organisms sought to be protected thereunder, other sections of the Act as well as the legislative history make it clear that Congress intended human health effects to be considered under section 307(a). Section 402(k), dealing with implementation of limitations and standards through the National Pollutant Discharge Elimination System (NPDES) permit program, accords special weight to "any standard imposed under section 307 for a toxic pollutant injurious to human health." The definition of "toxic pollutant" in section 502(13) describes a number of illustrative health effects of concern in human as well as aquatic organisms, and expresses concern with "ingestion through food chains" of toxic pollutants. Man as a consumer of fish and other aquatic organisms occupies a critical position in such food chains, and is thereby directly exposed to any toxic pollutant present in such organisms. He may also be exposed through ingestion of or contact with the water itself in which such pollutants are or may be present.

The legislative history of the Act further indicates that one of its fundamental objectives is protection of human health. The following language appears in the Report of the Senate Committee on Public Works discussing the definition of "toxic pollutant" in section 502(13) referred to above:

> A definition of toxic substances is provided to assist the Administrator in implementing his authority under Section 307 to regulate toxic discharges. The definition provides a benchmark for evaluating those pollutants which in certain concentrations would have a particularly adverse impact on humans as well as other forms of life. S. Rept. No. 92-414, 92nd Cong., 1st Sess., October 28, 1971, p. 77, reprinted in "A Legislative History of the Water Pollution Control Act Amendments of 1972" (hereinafter cited as "Legis. Hist.") at p. 1495.

The Report then proceeds to describe some of the features of a toxic pollutant which the Committee expected the Administrator to consider in the exercise of his authority under section 307 including, among others, "the seriousness and irreversibility of any effects on man or the environment that might occur" and "the possibility for incorporation into biological organisms and man in concentrations which the latest scientific knowledge suggests will produce effects on man and organisms." S. Rept., 92-414 at p. 78; Legis. Hist. at p. 1496. The public health concern is also reflected in the Report at p. 3-4, Legis. Hist. at p. 1421-2.

Second, the Agency has given further attention to measuring and monitoring technology capability in considering new standards. Third, it has reconsidered its hydrological assumptions and has eliminated from the operative language of the standards proposed at this time the use of "low flow" rates and "mixing zones." Fourth, the Agency has gathered additional data and has reassessed its previously accumulated data with respect to discharge of particular pollutants by particular industrial point source categories.

C. CONSIDERATION OF TECHNOLOGICAL AND ECONOMIC FACTORS

In addition, though not specifically required to do so under the language of section 307(a), the Agency has gathered data on available control technologies as well as the economic impact of the imposition of such controls. Section 307(a) is, by its terms, concerned primarily with protection of environmental health, including that of aquatic organisms, humans, and others along the food chain (c.f. Section 502(13)). Thus the Agency could set standards on the authority of this section without regard to technology constraints or economic impact. However, the statute does not preclude consideration of such factors, and in light of the claims raised by industry objectors at the previous hearings the Agency has concluded that the interests of responsible rulemaking are best served by giving at least some consideration to technological factors and the likely impact, if any, of the proposed regulations on the national economy. This approach has received judicial approval in other contexts. *Buckeye Power* v. *EPA*, 481 F. 2d 162 (6th Cir. 1973); *Environmental Defense Fund Inc.* v. *Ruckelshaus*, 439 F. 2d 584, 594 (D.C. Cir. 1971); *International Harvester* v. *Ruckelshaus*, 478 F. 2d 615, 637, 641 (D.C. Cir. 1973); c.f. also *Natural Resources Defense Council* v. *EPA*, 489 F. 2d 390, 411-412 (5th Cir. 1972) ("considerations of economic cost or technological feasibility are *always* to be subordinate to considerations of public health.") (Emphasis in original).

Consideration of technological factors, and by implication economic impact, appears in the legislative history of the Act with reference to section 307(a)(5), which requires the Administrator to "designate the category or categories of sources to which the effluent standard (or prohibition) shall apply." Congress clearly expected different levels of standards for different categories of industrial sources. The Senate Report states concerning section 307(a)(5):

> * * * The Committee has provided the Administrator with authority to differentiate among categories of sources in establishing requirements under this Section.
>
> This authority, for example, would give the Administrator the latitude to treat a plant that processes cadmium ore differently than he might treat a plant in which cadmium appears as a trace impurity. A similar ability to differentiate exists in the Clean Air Act. S. Rept., No. 92-414, 92nd Cong. 1st Sess. at 61 (1971); Legis. Hist. p. 1479.

The House Report states.

> The Administrator is directed under this Section to establish a list of substances which are recognized to be toxic when released into the environment. However, the standards which are to be established for that list may be varied pursuant to Section 307(a)(5) according to the category or categories of source to which the effluent standards shall apply. H. Rept., No. 92-911, 92nd Cong., 2nd Sess. at 112 (1972), Legis. Hist. 799.

Section 307(a)(5), as explained in the Committee reports, authorizes EPA to establish toxic standards at different levels for different categories of point sources. The only basis for establishing different levels for different point source categories would appear to be technological or economic differences in the various control techniques involved. If the standards were to be based solely on health or environmental effects there would be no basis for distinguishing among point source categories.

A further indication that the Administrator is allowed to give some considerations to such factors can be inferred from the language of sections 307(a)(1) and (2). These sections require that, both in publishing a list of toxic pollutants and in developing effluent standards for them, the Administrator shall take into account "the importance of the affected organisms." The statute does not say in relation to what the importance is to be considered. However, if the importance of the affected organisms is to be given a meaningful role in determining the stringency of the standards, it is a reasonable inference that Congress had in mind a consideration of their importance in relation to other important social and economic values.

Based upon the foregoing considerations, the Agency has concluded that it is authorized to give at least some consideration to the economic impact, including the availability of control technology, in setting standards under section 307(a), even though such factors must always be given less weight than the environmental and public health factors for which the standards must, under section 307(a)(4), provide "an ample margin of safety."

Apart from the Act itself, economic impact must be considered by the Agency under Executive Order No. 11821, 39 FR 41501 (signed November 27, 1974). This order and the implementation guidelines issued by the Office of Management and Budget, OMB Circular A-107, require federal agencies, including EPA, to assess the economic and inflation impact of proposed regulations and standards and make a determination as to whether or not the proposal is likely to have a significant impact on inflation. If it is concluded that such impact is likely, an Inflation Impact Statement (IIS) must be prepared by the Agency which evaluates, among other things, the probable effects of the regulations on costs, productivity, competition, and supplies of goods and services. In compliance with this Executive Order, it is the Agency's practice to make sufficient examination and assessment of the likely economic impact of its regulations to determine whether or not an IIS is required, and to prepare such a statement in all cases where it is required.

Executive Order 11821 requires that major proposals for legislation and promulgation of regulations and rules by Agencies of the executive branch be accompanied by a statement certifying that the inflationary impact of the proposals has been evaluated. The Administrator has directed that all regulatory actions that are likely to result in (1) annualized costs of $100 million, (2) additional costs of production more than 5% of the selling price, or (3) an energy consumption increase equivalent to 25,000 barrels of oil per day will require a certified inflationary impact statement. The analysis indicates that the total investment required to meet these regulations is $0.8-1.1 million with an annualized cost of $0.5-0.7 million. The costs as a percent of selling price are no more than 2.3%. Although the criteria for performing a certified inflationary impact statement have not been met, the Agency has assessed the potential economic impact of these regulations and concludes that there will be no significant adverse impact on production, prices, or the consumers of these products. More detailed information regarding economic impact is found in the discussion of each of the four pesticides.

D. THE NEED TO PROCEED WITH A LIMITED NUMBER OF SUBSTANCES AT A TIME

Experience with the 1974 hearings demonstrated that it is neither practical nor feasible to try to conduct a formal rulemaking hearing on as many as nine substances involving numerous different, unrelated industries. The very tight time

constraints imposed by section 307(a) allow only six months between proposal and final promulgation. To proceed with numerous substances poses unwarranted and intolerable burdens on the objecting parties, the Agency, and the presiding officer, with the likely result that the quality of the rulemaking will suffer.

For this reason, and in light of past experience, the Agency has decided to propose standards for a more limited number of substances at a time, in the hope that a hearing of limited scope will result in promulgation of responsible, well-developed standards within the six month time frame presently required by section 307(a). Thus the present proposal sets forth standards for four substances, and further proposals are expected in the future for additional substances.

It is against this background, and in this context, that the standards hereinafter set forth have been developed and are now proposed.

II. The Proposed Standards

In developing the standards proposed herein the Administrator has given careful consideration to each of the factors enumerated in section 307(a)(2). These factors include "the toxicity of the pollutant, its persistence, degradability, the usual or potential presence of the affected organisms in any waters, the importance of the affected organisms and the nature and extent of the effect of the toxic pollutant on such organisms." In light of the Act's manifest concern for public health as discussed above, the Administrator has also considered available data concerning human health effects attributable to the substances. The data considered by the Administrator relating to these factors of toxicity and environmental fate and effects are set forth for each of the four substances in a "Criteria Document." These four criteria documents, together with a general introduction thereto, are hereby incorporated by reference as a part of the statement of basis and purpose for the standards hereinafter proposed.

In addition, for the reasons stated in the preceding Section, the Administrator has considered the availability of various methods of control and related technology by which discharge of each of the substances might be eliminated or reduced. In order to obtain relevant data for this function, EPA engaged the services of an outside contractor, Midwest Research Institute ("MRI") of Kansas City, Missouri, who are experts on pesticide manufacturing and formulating wastewater treatment technology. Reports have been prepared and submitted by MRI concerning control technologies which actually are in use or which are or may be available to manufacturers and formulators of each of the four chemical pesticides for which standards are hereinafter proposed. Those reports are hereby incorporated by reference as part of the statement of basis and purpose of this proposed rulemaking.

The Administrator has also considered, for the reasons stated in the preceding section, the impact on the nation's economy of the setting of standards as hereinafter proposed. In order to assist the Agency in making this assessment, the Agency retained as outside consultants the firm of Arthur D. Little, Inc. of Cambridge, Massachusetts. Arthur D. Little, Inc. has submitted to the Agency a report for the four substances for which standards are hereinafter proposed. This report is hereby incorporated by reference as part of the statement of basis and purpose for those proposed standards.

Copies of each of the aforesaid criteria documents and reports are available for public inspection and copying at the U.S. Environmental Protection Agency, Public Information Reference Unit, Room 2922 (EPA Library), 401 M Street, S.W., Washington, D.C. 20460, and in similar Public Information Reference Units in each of the ten EPA Regional Offices, during normal business hours. In addition, copies of the reports may be purchased from the National Technical Information Service, 5285 Port Royal Rd., Springfield, Virginia.

The approach utilized in arriving at the standards for each substance is as follows. First, because the most important element in setting the standards is the toxicity considerations enumerated in section 307(a)(2), the starting point is the development of the criteria documents, which set forth extensive data with respect to the environmental effects and behavior of each pollutant. The purpose of each criteria document is to arrive at an ambient level of the subject pollutant, based upon the data, which will provide an ample margin of safety for all important aquatic organisms and others up the food chain, including man, who may become exposed to it. This ambient water criterion is expressed as a concentration of the pollutant in the water, normally in micrograms per liter (ug/1), or the equivalent measurement of parts per billion (ppb).

The toxicity data were derived from laboratory studies as well as field observations on the effects and behavior of each of the substances. These studies have been conducted on a variety of organisms including invertebrate, vertebrate, and mammalian test species, and are well documented in the scientific literature. In addition, recent data developed by the Agency's Office of Research and Development through its various laboratories, and other non-Agency sources, have been considered. These studies provided extensive acute and chronic toxicity data based primarily on feeding experiments for a wide range of aquatic organisms and consumers of aquatic organisms.

Studies documenting bioaccumulation in the food chain organisms and bioconcentration by organisms directly from the water provided an important additional component data base upon which criteria were derived. Appropriate human toxicity data and mammalian carcinogenesis studies, where available, were also considered, as were data on persistence and degradability.

Data on toxic effects of pollutants are not available for all species that may be exposed to toxic pollutants in the complex ecosystem. There is a vast number of species throughout the entire ecosystem, and it would be impractical to try to gather test data on every one, or even most of them. Because such data are not available on all species, the range of sensitivity of a smaller number of tested species is used to provide a measure of the range of sensitivity of all species. The Agency's criteria for these four pesticides are based upon a wide range of toxicity data for a phylogenetic cross section of organisms as well as species representative of a wide geographic distribution.

Section 307(a) requires consideration of the importance of organisms likely to be affected. Ecological importance of an organism is dependent on the role the organism plays within the ecosystem and upon its relationship to the food chain within the aquatic community and to consumers of aquatic life, including man. Thus, toxicity data for the carnivores at the top of the food chain in a given ecosystem, as well as economically important species such as trout, salmon, menhaden and shrimp are properly considered in the development of a protective criterion level. Toxicity data for organisms such as the stonefly and *Daphnia* are also important since these organisms are a food base for higher consumers and are representative of invertebrate species found in most waters of the United States.

On the basis of the foregoing data, a concentration level is selected which, it is believed, will provide an ample margin of safety for all important organisms likely to be affected by it, assuming a continued, or chronic, presence of the pollutant at that level in the water.

After thus arriving at an ambient water criterion, or prohibition where justified, the Agency examined feasible control technology to ascertain what concentration levels industrial dischargers might be able to achieve in their effluents. The ambient water criterion for each of these four pesticides was found to be extremely low, for example, 0.004 μg/1 for endrin and 0.005 μg/1 for toxaphene. Apart from a prohibition on discharge, there does not appear to be any wastewater treatment technology available to achieve these levels. Indeed, as discussed more fully below, the best that laboratory-demonstrated technology appears to be able to achieve within the tight one-year compliance time required under section 307(a) is in the vicinity of 1 to 1.5 μg/1. This exceeds the ambient water criterion by a factor of several hundred.

Discharge of relatively modest amounts of a pollutant into the water at 200 to 300 times the ambient water criterion may be allowed, however, without necessarily failing to provide an ample margin of safety for affected organisms. First, the actual discharge concentration does not normally remain the ambient concentration. In fact, for the typical discharge situation, the effluent disperses

following discharge and becomes greatly diluted. The area of dilution is often referred to as a "mixing zone," and will vary in size and shape from one body of water to the next. The result of this phenomenon is that the pollutant concentration typically becomes greatly diluted in the receiving water and may not even be detectable. Concededly, there may in some instances, be adverse effects on some organisms in the immediate vicinity of the outfall. However, for chronic effects to be observed, the exposure time would have to be quite lengthy—perhaps a lifetime. Even acute toxic effects, which normally occur at much higher dosage levels than chronic effects, are generally recorded based upon a 96-hour exposure.

Recognizing these realities, the Agency has concluded that with respect to the pollutants for which standards are proposed at this time, adequate protection under section 307(a) can be achieved by requiring existing dischargers to do the very best that is possible within the bounds of feasibility, and that standards should be set which take into account methods which achieve or most nearly approach the ambient water criterion. For new sources, if further technology advances can be reasonably expected, a more stringent limitation may be set to take such expected advances into account. Where the criteria data warrant prohibition on discharge of the pollutant and either (a) there are no known dischargers in the category covered; or (b) technology can feasibly achieve a prohibition, then the standard should require a prohibition.

To minimize total environmental burden, a limitation on discharge based upon weight per unit of production expressed in terms of kilograms per thousand kilograms is also included. The weight loading is tied to production levels to provide even-handed treatment to small and large producers.

Translating a safe water quality criterion number to an end-of-the-pipe standard is at best an imprecise calculation. The dispersion and dilution factors discussed above are expected to insure that, in most cases, an ample margin of safety is provided. The Agency recognizes, however, that there may be a few cases where, because of local receiving water conditions, notably with respect to hydrology, sufficient dispersion and dilution may not take place. To deal with such cases, the proposed standards include provision in the nature of a more stringent variance allowing the cognizant regulating authority (normally the issuer of an NPDES permit applicable to the discharger) to impose such more stringent effluent limitations as may be required in order to achieve the ambient water criterion, at least beyond the boundaries of any applicable mixing zone. This mechanism assures reasonable compliance with the statutory baseline of an "ample margin of safety." It is possible that an exercise of this variance provision could result in plant closure, although none is expected at this time. In any case, by allowing some consideration for technology, even though considerations of ecological and health effects are predominant, this approach makes it reasonably probable that if there are to be any shutdowns, they will occur only after a site-specific examination, and only because of a failure to meet the minimum requirements of section 307(a).

Setting an "end-of-the-pipe" effluent standard at a level which is substantially less stringent than the chronic criterion recognizes the inherent safety factors built into the latter number, which is derived from direct, sustained exposure of the more sensitive species with no dilution or dispersion allowance. Clearing, as one backs away from that very stringent number the amplitude of the margin of safety is decreased. Yet the statutory "ample margin" concept is an elastic one which, like the importance of the organism, allows for considerable exercise of judgment by the Administrator in setting the standards. In any case where a discharge is allowed, on the spectrum ranging from certain safety (a prohibition) to that uncertain point where harmful effects are caused and safety ends, a logical break point is struck where the very best that control technology can do is required. Setting a standard at this point, coupled with the "tightening" variance, achieves the purpose of the Act without inflicting unreasonable and unjustifiable economic and social costs.

The proposed regulations, including the standards for each of the four substances which are the subject of this rulemaking, are discussed in the following paragraphs.

General Provisions

Sections 129.1 through 129.8 of the proposed regulations contain general provisions including such matters as scope, definitions, and compliance. Sections 129.100 through 129.103 then set forth the specific standards applicable to each of the toxic pollutants.

With respect to general provisions, § 129.1 entitled "Scope and Purpose" describes generally the application of the standards. Subsection (a) establishes the applicability of the standards and prohibition to all owners and operators of facilities within the specified industrial categories which discharge process wastes or process-related wastewater. A special subsection entitled "Applicability" is included in the standards proposed for each of the four pollutants covered at this time (see, for example, § 129.100 (b)(1)) which specifies that the coverage includes all process wastes and all discharges (including stormwater runoff) from the immediate manufacturing, loading, storage, incineration, and related areas. The standards do not apply to runoff from areas contaminated solely by fallout from air emissions. Furthermore, the standards do not apply to non-process discharges from locations outside these areas. However, these latter discharges must nevertheless be covered by conventional NPDES permits if they are from lands or facilities used for industrial or commercial activities, and if they convey stormwater runoff contaminated by contact with aggregations of wastes, raw materials, or pollutant-contaminated soil (41 FR 11303 (1976)). Effluent limitations for such discharges will be established by permit issuing authorities on a case-by-case basis.

Subsection (b) provides that the standards may be incorporated in any NPDES permit, modification or renewal thereof. Subsection (c) provides for the application of the provisions of 40 CFR Part 124 and Part 125 with respect to permits.

Section 129.2 defines the terms used throughout this Part. As noted in the Section itself all terms not defined in the Section will have the meanings given them in either the Act or 40 CFR Part 124, or 125 as applicable. Most of the terms are so defined except the following:

(1) Subsection (c) defines "effluent standard" to be equivalent to the term "effluent limitation", as defined in section 502(11) of the Act, with the exception that it does not include a schedule of compliance. This definition is adopted for purposes of these standards since the term "effluent standard" is not defined in the Act and further because a permit may in fact contain a limitation on effluents which may vary from the specific number provided in the national standard, and discharge in compliance with such a permit should not be treated as a violation within the meaning of section 307(d) of the Act.

(2) Subsection (d) defines "prohibited" as the absence in a discharge of a specified pollutant in any amount detectable by any method.

(3) Subsection (g) defines an "ambient water criterion" of a substance in the receiving water as that level at which no adverse effects are observed (or expected, based upon test data) with respect to an organism over at least a 96-hour period, and normally extending through one reproductive life cycle, or which is determined on the basis of information relevant to human exposure. This definition is intended to provide a ceiling of safety in the receiving water for aquatic life and other organisms likely to be affected by continued discharges of the pollutant in question.

(4) The terms "new source," "existing source," "source," "owner or operator," and "construction," defined in subsections (h), (i), (j), (k) and (l) respectively, are adapted from section 306(a) of the Act.

(5) Subsection (n) defines "process wastes" to mean any of the designated toxic pollutants whether in wastewater or otherwise present which is inherent to or unavoidably resulting from any manufacturing process and is subject to discharge into the navigable waters.

(6) The terms "air emissions," "fugitive dust, mist or vapor," and "stack" in subsections (o), (p) and (q), respectively, are defined so that a distinction can be made between a pollutant which results from a spill or poor "housekeeping" practice and that same pollutant which results from fallout from air emissions. For the limited areas specified in the standards, runoff containing the toxic pollutant caused by spills and "housekeeping" are subject to the standards. Runoff from excluded areas is not covered.

Section 129.4 entitled "Toxic Pollutants" lists the pollutants that will be regulated under this Section of the Act, and provides the chemical definition for each. As noted in this proposed rulemaking, only four pesticides are included.

These are aldrin/dieldrin, DDT (DDD and DDE), endrin, and toxaphene. In each subsequent proposed rulemaking this section will be amended to include additional toxic pollutants and their chemical definitions.

Section 129.5 pertains to compliance and provides for implementation through the NPDES permit program. Sections 402(a)(1) and 402(b)(1)(A) require that any NPDES permit insure compliance with any applicable requirement under section 307(a). Thus, while enforcement for violation of a 307(a) standard may be effected directly through section 307(d), it is also contemplated that the standard be actually incorporated and implemented in an NPDES permit issued to any point source discharger to whom a 307(a) standard applies. Consequently present regulations require permits to include applicable 307(a) standards. 40 CFR 124.45(g), 125.22(a)(6).

Subsection (a)(1) of § 129.5 provides that any owner or operator subject to these standards notify the cognizant NPDES permit issuing authority within 60 days of the date of promulgation of any applicable toxic pollutant effluent standard. Such notification should include identification of the point source and of the applicability of the standard to it. The permitting authority then has the option of issuing a permit or permit modification to the source which incorporates the 307(a) standard together with applicable monitoring and reporting requirements, or of notifying the owner or operator of the source by letter as to these requirements without actually issuing a permit or modification at that time. Subsection (a)(2) provides that any owner or operator who does not have a discharge at the time of promulgation of an applicable standard and who subsequently commences or intends to commence such a discharge must notify the permit issuing authority at least 60 days prior to such discharge.

Subsection (b) provides that the process of incorporating a 307(a) standard into an NPDES permit is to follow the procedures established in the applicable provisions of 40 CFR, Parts 124 and 125, which pertain to NPDES permits. Although public hearings and adjudicatory proceedings might be held pursuant to those Sections in connection with any permit or application, or variance proceeding, the scope of any such proceedings is limited by subsection (g) discussed below.

Subsection (c) provides that any permit containing a toxic pollutant effluent standard is subject to revision following the completion of any proceeding revising the underlying toxic pollutant effluent standard regardless of the duration specified in a permit. This is to indicate that even though a permit may be issued for a 5-year period, if the underlying standard is changed the permit automatically becomes subject to that change in the toxic pollutant effluent standard at that time. This is pursuant to section 402(k) of the Act, which excepts "any standard imposed under section 307 for a toxic pollutant injurious to human health" from the general rule that compliance with a permit, once issued, will be deemed compliance with sections 301, 302, 306, 307, and 403 for the duration of the permit. All 307(a) toxic pollutants are regarded as injurious to human health unless the particular standard for such pollutant specifies to the contrary. This provision is also consistent with section 307(a)(3) of the Act, which requires that the standards be reviewed and revised where appropriate every three years.

Subsection (d)(1) establishes compliance monitoring and reporting requirements. It provides the Regional Administrator (or State Director, if appropriate) the authority to impose monitoring, sampling, recording, and reporting requirements upon any dischargers subject to § 307(a) standards or prohibitions. It is intended that this authority will be used for compliance monitoring and other data gathering purposes, particularly with regard to dischargers whose NPDES permits have not been modified or reissued to reflect § 307(a) standards or prohibitions. Section 308 of the Act provides EPA (and the States) the legal authority to impose such monitoring and reporting requirements upon dischargers.

Subsection (d)(2) provides that in addition to monitoring and reporting requirements specified in NPDES permits pursuant to subsection (d)(1), the owner or operator of a discharge subject to a section 307(a) standard or prohibition shall report annually on the compliance of such discharge. This subsection specifies the basic content of the report.

Subsection (e) provides that these regulations do not prohibit either a Regional Administrator (paragraph (1)) or a State Director (paragraph (2)), as appropriate, from making permit conditions more stringent pursuant to § 301(b)(1)(C) of the Act, so as to meet State water quality standards or other requirements of law.

Subsection (f) provides that any owner or operator of a facility who discharges partially to a publicly owned treatment works and partially directly to navigable waters must restrict his total emission. The total amount discharged must conform to the less restrictive of either a direct discharge standard or a pretreatment standard, but the proportional amount discharged to the navigable waters must not exceed the level specified in these standards.

Subsection (g) provides that in any permit hearing or other administrative proceeding relating to the implementation or enforcement of these standards, or any modification thereof, or in any judicial proceeding other than a petition for review of those standards pursuant to section 509(b)(1)(C) of the Act, the parties may not contest the validity of any national standards established in this Part, or the ambient water criterion established herein for any toxic pollutant. The proper forum for challenging any proposed standard and its underlying data base including, for example, data relating to toxicity, persistence, bioaccumulation and related matters is the rulemaking hearing. Similarly the exclusive procedure established by Congress for judicial review of the standard is a petition to the United States Court of Appeals pursuant to section 509(b)(1)(C) of the Act. Sound administration requires that the standards, including the ambient water criteria which are established as part of the standards, not be "relitigated" in every permit proceeding or enforcement action. This approach is consistent with that followed by the Agency with respect to its effluent limitations guidelines established pursuant to section 301 and 304 of the Act, the contents of which may be challenged solely under section 509(b) of the Act and not in any subsequent permit or enforcement proceedings. Cf. Section 509(b)(2) of the Act and Decision No. 4 of the General Counsel on Matters of Law Pursuant to 40 CFR 125.36(m) issued March 6, 1975.

Section 129.6 provides for an allowance for the presence of toxic pollutants in intake waters. Under this section, to the extent that the inability of a discharger to meet an effluent standard for a particular toxic pollutant results from presence of that same pollutant in his intake waters, a credit should be provided, so that the standard shall be applied to that extent on a "net" basis. The credit is allowed only when the source of the intake waters is the same as that to which the discharge is made. This incorporates the principles established in 40 CFR 125.28.

Section 129.7 establishes a mechanism for imposing an effluent limitation on a particular discharger more stringent than that prescribed in the national standard where, because of unusual site-specific receiving water conditions, a more stringent limitation should be imposed in order to provide the measure of safety required by the Act. This is, in effect, a "tightening" variance clause. Section 307(a) neither expressly permits nor forbids the use of such a variance clause. The purpose for which this clause is proposed is to deal with such situations as could occur where there are multiple discharges of the toxic pollutant into a body of water, poor dilution, or insufficient dispersion. Such conditions may result in a concentration in the receiving water which is greater than the ambient water criterion determined by the Agency in establishing the national effluent standard in these proceedings. These conditions may result in, or may cause or contribute to, significant adverse effects to aquatic or other organisms usually or potentially present, or to human health. Such situations would call for a more stringent effluent limitation for discharges to that body of water than that established in the national standard in order to provide the "ample margin of safety" specified in section 307(a)(4) of the Act.

It is neither practical nor possible to set a national standard which is precisely tuned to the hydrology, hydrography, and water quality conditions of the receiving waters of each discharger who might be affected by these regulations.

Because the national standard for some substances may be set at a number which is several orders of magnitude more relaxed than the ambient water criterion, as in the proposed standards for endrin and toxaphene manufacturers, the proposed variance would, in effect, give the regulations some degree of flexibility. The overall result is to allow a discharge in those cases and at those levels where technological and economic considerations indicate that this is justified, and where the safety requirements of section 307(a) are not violated, and to provide for a tightening of the limitations where site-specific conditions require it in order to provide the necessary environmental protection.

Ample judicial authority exists for such a variance clause, even absent express statutory authority, in order to achieve what is frequently characterized as the salutory objective of administrative flexibility and the avoidance of harsh or unjust results. See, e.g., *Train v. Natural Resources Defense Council, Inc.*, 95 S. Ct. 1470 and cases discussed at 1478–1479 (1975); *Gulf Oil Co. v. Hickel*, 435 F. 2d 440, 447 (D.C. Cir. 1470); *Portland Cement Association v. Ruckelshaus*, 486 F.2d 375, 398–399 (D.C. Cir. 1973); *WAIT Radio v. FCC*, 418 F.2d 1153 (D.C. Cir. 1969); *National Petroleum Refiners Association v. FTC*, 482 F. 2d 672 (D.C. Cir. 1973); *United States v. Allegheny Ludlum Steel Corp.*, 406 U.S. 742, 755 (1972).

Thus in *Portland Cement Association v. Ruckelshaus, supra*, in discussing a proposed variance procedure in the Agency's Clean Air Act new source performance standards, the Court stated that such a provision:

> (I)n some sense * * * imparts a construction of "reasonableness" to the standards as a whole and adopts a more flexible system of regulation than can be had by a system devoid of "give". As we noted in *International Harvester, supra*, a regulatory system which allows flexibility, and a lessening of firm proscriptions in a proper case can lend strength to the system as a whole. The limited safety valve permits a more vigorous adherence to an effective regulation. 478 F.2d at 641.

For these reasons, in its regulations issued pursuant to sections 301 and 304 prescribing effluent limitations and guidelines based upon "the best practicable control technology currently available," EPA has provided for a permit variance from national effluent guidelines in cases where the site-specific factors are "fundamentally different" from those upon which the national regulation was based, see, e.g., 40 CFR 430.32, even though there is no express authority in the statute for such a provision. Use of this variance clause was recently upheld by the Third Circuit in its review of the Agency's effluent limitations and guidelines for the steelmaking phase of the iron and steel industry. *American Iron and Steel Institute et al. v. EPA* 526 F.2d 1027, 1049, 1061 (3rd Cir. 1975), (remanded on other grounds). See also *E. I. du Pont de Nemours & Co. et al. v. Train*, — F.2d —, 8 E.R.C. 1718, 1722 (4th Cir. 1976).

The variance clause herein proposed is expected to be used only in exceptional circumstances. If the Regional Administrator or State Director has evidence that a discharge at the level required by the standard will cause ambient receiving water quality, even outside a reasonable mixing zone, to exceed the ambient water criterion, and that this is resulting in or may cause or contribute to, significant adverse effects to aquatic or other organisms usually or potentially present, or to human health, he may propose a more stringent limitation. In subsequent proceedings under the existing NPDES rules of procedure (40 CFR Part 124 or 125), the proponent of such variance has the burden of showing it is justified. Evidence thereof would normally include results of sampling and analysis of receiving water in various locations both near and remote from the proposed outfall, and projections as to the effect thereon of the proposed discharge, both at the level allowed by the national standard and at the more stringent level proposed by the regulating authority, taking into consideration dilution, dispersion, and other relevant hydrologic and hydrographic considerations. Any modification of the national standard must provide "an ample margin of safety" as required by the Act, which in turn is reflected in the ambient water criterion. Review by the Administrator under subsection (c) will be used to assure this objective as well as to maintain consistent application of the variance clause throughout the nation. The Agency believes that this procedure will best reconcile the statutory requirement of a uniform national standard with the need for fairness and some degree of site-specific flexibility.

Section 129.8 establishes that the effluent standards shall be complied with not later than one year after promulgation, unless an earlier compliance date is provided in a particular standard for a particular pollutant. This provision is required by section 307(a)(6) of the Act. It is also provided in light of that Section that no permit proceedings (including any variance proceeding) shall operate to delay the effective date herein established. The need for compliance on or before the effective date is required by section 307(d) of the Act, which provides that:

> After the effective date of any effluent standard or prohibition or pretreatment standard it shall be unlawful for any owner or operator of any source to operate any source in violation of any such effluent standard or prohibition or pretreatment standard.

The phrase "effective date" as used in that section was apparently intended by Congress to mean the date for compliance and is so construed in these proposed regulations.

These general regulatory provisions are not "Standards" within the meaning of section 307(a) and therefore need not be subject to formal rulemaking hearings. The Agency is, however, proposing them together with the proposed standards in a single proceeding in order to allow public comment and participation on the proposed standards in the context of the general provisions in the belief that this will result in a more informed rulemaking proceeding. However in the event that future amendment of the general provisions becomes appropriate, this may be done through the "informal" rulemaking procedure under 5 U.S.C. 553.

The Standards

Sections 129.100 through 129.103 contain the effluent standards themselves. The standards here proposed are to cover manufacturers of each of the pesticides as well as formulators of any products containing such pesticides. Manufacturers are defined to include anyone who produces, prepares or processes the substance or uses it in the production of another synthetic organic substance. With respect to the later category, the Agency is unaware of any existing direct discharger, though at least one discharger to a publicly owned treatment works exists. It is believed that this provides coverage for all known point sources of discharge or potential discharge. Coverage is provided for both existing and new sources, the latter being defined as any source on which construction is begun following the date of this proposed rulemaking, patterned after the definition contained in section 306 of the Act.

A separate section is established for each toxic pollutant. Within that section there are established standards for manufacturers and formulators, for new and existing sources. Each section also describes the applicability of the standard and acceptable analytical methods. In addition, provision is made for determination of weights and concentrations. The specialized definition of "manufacturer" for each pesticide is so worded as to make clear the Agency's intent that an individual engaged solely in agriculture or silviculture and who, as such, may be an end user of products containing one or more of these pesticides is not a "source" covered by these proposed standards.

In cases where a discharge is allowed, the standard will be specified as an average concentration limit calculated using the results from the working days in a month, a maximum concentration for the sample representing any working day and a standard specified as a mass emission per unit of manufacturing output. In the case of pesticides the manufacturing output selected will be kilograms discharged per thousand kilograms of active ingredient produced.

A. ALDRIN/DIELDRIN

(1) *Nature and Use; Manufacture and Formulation; Wastewater Characteristics.* Aldrin (1,2,3,4,10,10-hexachloro-1,4,4a,5,8,8a-hexahydro-1, 4 - endo - 5,8-exo-dimethanonaphthalene) and dieldrin (1,2,3,4,10,10-hexachloro-6,7-epoxy-1,4,4a,5,6,7,8,8a - octahydro - 1,4 - endo-5,8 - exo - dimethanonaphthalene) are chlorinated hydrocarbon pesticides and have been two of the most widely used domestic pesticides. Although aldrin is used in greater quantity than dieldrin,

it is quickly transformed to dieldrin in the environment. They are currently used primarily for the control of termites, for moth proofing, and for nursery dipping of roots and tops of nonfood plants. Since aldrin is rapidly transformed to dieldrin the term aldrin/dieldrin is used as a single entity. Aldrin/dieldrin bioaccumulates, is persistent, and is toxic to aquatic organisms and consumers of aquatic life, including man.

Aldrin use in the U.S. peaked in 1966 at 19 million pounds, but had dropped to about 10.5 million pounds by 1970. During that same period dieldrin use decreased from one million pounds to about 670,000 pounds.

Based on registrations currently on file with the Agency, neither aldrin nor dieldrin is presently manufactured in the United States. The last manufacturer was the Shell Chemical Company. Shell ceased manufacturing aldrin and dieldrin in 1975 following cancellation by the Environmental Protection Agency of most uses of these pesticides under the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA), as amended by the Federal Environmental Pesticide Control Act of 1972, (7 USC § 135 et seq.), discussed below. EPA's suspension order dated October 1, 1974, permitted use of aldrin and dieldrin for subterranean termite control, as a root and top dip for non-food plants, and for use in closed moth proofing systems.

The manufacturing process at Shell for aldrin did not have a liquid process waste stream. The only liquid waste generated by this part of Shell's plant was floor washings and spill cleanups which were contaminated by small amounts of aldrin. The dieldrin portion of the plant had some contaminated process waste streams. Shell's method of disposal for all chemical waste generated from these operations was an evaporation pond covering approximately 100 acres. Shell estimated the evaporation basin to be capable of evaporating a minimum of 150 gallons of water per minute on a year round average basis. The pond was reported to have had no detectable leaks in its 17 years of use and was used for many other substantial waste streams in addition to discharges from the aldrin/dieldrin manufacturing operations.

There were basically seven types of aldrin and dieldrin formulations available: emulsifiable concentrates, granules, wettable powders, dust, seed dressing, oil solution, and fertilizer mixture. The emulsifiable concentrates accounted for 35 to 40% of the formulated product, while granules accounted for another 35 to 40%. Available data indicate that currently there are 3 plants formulating aldrin and 6 formulating dieldrin products.

(2) *FIFRA Proceedings.* In early 1970, based on a concern to limit dispersal of aldrin/dieldrin in the environment, the U.S. Department of Agriculture cancelled all registrations for these pesticides in or on aquatic areas.

On December 3, 1970, the Environmental Defense Fund, Inc. filed a petition with EPA requesting immediate cancellation and suspension of all Federal registrations of aldrin/dieldrin products under FIFRA on the basis that these substances cause severe environmental damage and appeared to be probable carcinogens.

On March 18, 1971, the Administrator announced that since the material contained in the petition and in scientific literature raised a substantial question as to the safety of these products, EPA was issuing notices of cancellation of all registrations of aldrin and dieldrin products.

In response to a request by 84 companies whose products would be affected by the cancellation order, a scientific advisory committee reviewed the matter and issued a report in March 1972 recommending that the following uses be disallowed: all applications by aircraft; all foliage methods in which residues are discharged into waterways or settling ponds; all uses in structures occupied by humans or livestock; use on turf except as controlled by trained or licensed pest-control operators, greenskeepers and nurseymen; and any use involving application in aquatic environments.

Because the Administrator in 1971 declined to suspend all registrations of aldrin/dieldrin during the administrative cancellation proceedings, the Environmental Defense Fund petitioned for review of this decision in the D.C. Court of Appeals. In May 1972, the Court remanded the matter to EPA for further consideration in light of the advisory committee report, which was issued on May 28, 1972, *Environmental Defense Fund, Inc.* v. *EPA*, 465 F. 2d 528 (D.C., Cir. 1972).

In June 1972, an amended EPA order lifted cancellation of aldrin/dieldrin for restricted termite use, nursery dipping of roots and tops of non-food plants, and mothproofing of woolen textiles and carpets where there is no effluent discharge. These are the only uses for which registrations are being accepted as of the present date. Cancellation of all other major uses of these chemicals was continued.

During the course of the cancellation proceedings substantial evidence was developed indicating strongly that aldrin/dieldrin poses a severe hazard to human health as well as to the health of other organisms, and that it is a dangerous carincogen. Accordingly, the Administrator announced on August 2, 1974, his intention to suspend the registrations and prohibit the production for use of all pesticide products containing aldrin or dieldrin which were the subject of the still-pending cancellation proceedings. Following a hearing before EPA's Chief Administrative Law Judge, and based upon detailed findings of fact and conclusions, suspension was recommended on September 20, 1974, and was then ordered by the Administrator on October 1, 1974. The Administrator's Notice of Intent to Suspend and Findings as to an Imminent Hazard on August 2, 1974, together with the Recommended Decision of the Administrative Law Judge of September 20, 1974, and the Administrator's Opinion and Order on the suspension of October 1, 1974, were published in the FEDERAL REGISTER, Vol. 39, No. 203, captioned *Shell Chemical Co. et al.*, EPA FIFRA Docket Nos. 145 etc, 39 F.R. 37246 et seq. (October 18, 1974).

Thereafter the U.S. Court of Apepals for the D.C. Circuit affirmed the suspension order, remanding only for the limited purpose of considering whether the ban should be broadened to include existing stocks, *Environmental Defense Fund, Inc.* v. *EPA*, 510 F. 2d 1292 (D.C. Cir. 1975). Among other things the court upheld the evidentiary basis for the Administrator's conclusions that aldrin/dieldrin is carcinogenic in mice and rats approved the Agency's extrapolation to humans of data derived from tests on animals, and affirmed the conclusion that aldrin and dieldrin pose a substantial risk of cancer to humans and thus constitute an "imminent hazard" to man.

Notwithstanding the Administrator's decision as to the cancellation of the various uses of aldrin/dieldrin in the United States, the pesticides will continue to be formulated, and may again be produced in this country as long as any uses are permitted and as long as demand for them continues in other parts of the world. Therefore, limits that protect all receiving water uses must be placed on concentrations of aldrin/dieldrin in effluents of plants that produce or formulate these pesticides.

(3) *Toxicity.* Toxic effects resulting from the presence of aldrin/dieldrin in water have been documented for aquatic organisms representing a wide phylogenetic cross section and a wide geographic distribution. Extrapolation of such effects found in laboratory and field studies is a reliable means of predicting the effects of aldrin and dieldrin on individual organisms and their food chains and is recognized as such by the scientific community. In addition to reliable laboratory data, aldrin and dieldrin have been identified as having caused or contributed to a number of fishkills and deaths of other organisms as a result of its use in the environment.

A review of published toxicity values shows that levels in the range of 1 microgram per liter of aldrin and dieldrin are toxic to many fish and invertebrate species, to such commercially important species as the shrimp, and to food chain links such as stoneflies. These pesticides are also acutely toxic to birds and mammals. Human acute poisoning has resulted from ingestion, inhalation and/or skin absorption. Liver damage from chronic exposure has also been reported.

Species which have been tested are found distributed widely in fresh or marine waters and some are important food organisms. The dose concentration which is lethal to 50 percent of a tested species over a period of 96 hours, known as the LC50 (or LD50 or TLm), is a commonly used indicator of acute toxicity. Two examples of important species and their 96-hr LC50 values for aldrin/dieldrin are: 0.7 ug/1 (micrograms per

liter) for the commercially important human food organism, pink shrimp, and 0.5 ug/1 for the stonefly. With aldrin the corresponding value for the hermit crab has been reported as 33 ug/1. A 96-hour LC50 value for the bluegill exposed to aldrin was reported as 5.2 ug/1. Juvenile white mullet yield a 48-hour TLm of 2.8 ug/1. Ninety-six hour LC50 values for the shiner perch and dwarf perch were reported as 2.26 ug/1 and 2.03 ug/1, respectively.

For dieldrin, 96-hr LC50 values have been found to be: bluegill, 2.8 ug/1; shiner perch, 1.5 ug/1; dwarf perch, 2.4 ug/1; and American eel, 0.9 ug/1.

Growth and reproductive performance of the sailfin molly were adversely affected during a 34-week exposure to 0.75 ug/1 dieldrin. Similar results have been reported with other fishes. These effects include changes in oxygen consumption, adverse effects to whole body lipid and liver condition and reduced ability to withstand temperature change.

Dieldrin has been shown to be both acutely and chronically toxic to birds. The LD50 for the sharp-tailed grouse was reported as 6.9 mg/kg (milligrams per kilogram, or parts per million) of body weight. Long-term feeding studies have demonstrated a variety of subacute and chronic effects attributable to aldrin and dieldrin. These include reduced fertility and egg production, adverse behavioral changes as measured by visual cliff tests, growth depression, mortality of young and eggshell thinning.

In rats aldrin and dieldrin have been shown to be acutely toxic at levels of 50–56 mg/kg of body weight. Single doses as low as 30 mg/kg of body weight have produced impaired liver function in rats, while 100 parts per million (ppm) in feed caused abortions in guinea pigs. Effects of dieldrin on other mammals include increased neonatal mortality, fetal malformations, kidney damage, cytogenetic aberrations, liver enlargements, and dose-responsive tumor production. In feeding studies with CF–1 mice, tumors were produced by dietary levels as low as 2.5 ppm.

(4) *Human Health Effects.* Evidence that aldrin/dieldrin poses a cancer hazard to man is provided by laboratory data using rodents. The carcinogenicity of aldrin/dieldrin to mouse strains other than the CF–1 studies mentioned above has been demonstrated. Although the liver is the principal organ affected in the mouse and was a major site of action in rats, there was also an increase in tumors of the lungs and other organs.

Aldrin and dieldrin poisoning of humans may occur by ingestion, inhalation and/or skin absorption. Severe symptoms may result from ingestion or percutaneous absorption of as little as 1 gram, especially in the presence of liver disease. Renal damage, tumors, ataxia and convulsions, followed by central nervous system depression, respiratory failure and death are symptoms resulting from acute exposure. Chronic exposure over a prolonged period may result in liver damage. In humans, pregnancy has been observed to offer a degree of protection from dieldrin intoxication to the mother, but at the expense of the fetus which concentrates dieldrin in its tissues.

Chemicals known to cause cancer in man have been identified only through epidemiological studies, either in the general public or in occupationally exposed workers. In the case of aldrin/dieldrin, epidemiological studies have not been possible because there are no clear-cut differential levels of exposure and because the period of exposure has been too short. Some cancers in man do not develop until late in life, following a 20- to 40-year incubation period. Animal studies are accepted as reliable indicators when assessing the carcinogenic potential of a chemical to man.

Mice and rats are commonly used experimental animal species, both because their relatively short life span permits lifetime testing within a reasonable period of time and because the development of tumors in these species is well known. Laboratory testing has established that aldrin/dieldrin induces cancer in five different strains of mice and probably in the rat. Based on these data this Agency concluded in the FIFRA proceedings discussed above, that aldrin and dieldrin pose a serious cancer risk and health threat to man.

(5) *Persistence and Degradability.* Aldrin is readily converted to dieldrin in the environment, and dieldrin is persistent. If it degrades at all, it does so at an almost imperceptible rate. Few bacterial isolates were found to degrade dieldrin and biodegradation studies using higher organisms confirmed its relatively inert nature with respect to metabolism. Because of these findings it has been concluded that no biological systems are important in reducing the actual toxicity of dieldrin entering their metabolism.

Experimental studies have shown that ultraviolet light produces photoconversion isomers of aldrin/dieldrin which may be more toxic than the original compounds. Sunlight also causes degradation, but overall decomposition rates are inadequate to prevent its persistence in the biosphere. Rain waters, drinking waters and non-potable waters have been shown to contain dieldrin.

(6) *Bioaccumulation.* Because of its extreme insolubility in water and high lipid solubility, aldrin/dieldrin is readily bioaccumulated. A 7,480-fold accumulation has been reported in algae; 114,935 in snails; 100,000 in fish; 247 in crabs and 1,015 in the clam. An ostracod has been shown to accumulate dieldrin to levels as high as 260,000 times those of the initial calculated water concentration. Residues of aldrin and dieldrin have been found in most molluscs, fishes, birds, and mammal species, regardless of geographical location.

(7) *Criteria Formulation.* An ambient water criterion of 0.003 μg/1 would provide for the protection of aquatic life. In view of the persistence, bioaccumulation potential and carcinogenicity of aldrin/dieldrin every reasonable effort should be made to minimize human exposure.

Bioaccumulation studies with aldrin/dieldrin have shown that fish tissue accumulates as much as 100,000 times the ambient water concentrations. The primary impact of this bioaccumulation in fish and their food sources centers on the biological transport of aldrin/dieldrin to birds and to mammals, including man. With carcinogens there is no demonstrated "no effect" level. Therefore all human exposure to aldrin/dieldrin should be minimized.

The National Academy of Sciences recommends that in determining a chronically safe exposure level it is reasonable to apply an "application factor" to available acute toxicity data. The resulting chronic level is lower than the acute toxicity level, since effects from long-term exposure are observed at lower concentrations than in cases of 96-hour or other short-term exposure. The National Academy prescribes an application factor of 0.01 times the demonstrated acute toxicity levels for chlorinated hydrocarbon pesticides such as aldrin/dieldrin. See National Academy of Sciences/National Academy of Engineering, *Water Quality Criteria 1972* (Washington, D.C. 1973), p. 185 (See also *Society of Plastics Ind.* v. *OSHA*, 509 F. 2d 1301, 1308 (2nd Cir, 1975)). Applying this factor to the toxicity data noted above, including acute toxicity to several important species which clustered around or just below the 3 μg/1 level, a criterion of 0.003 μg/1 would be protective of commercially important food organisms such as the pink shrimp, and the organisms at the base of the food chains as represented by the stonefly.

Establishment of so restrictive a criterion is supported by reference to bioaccumulation factors coupled with the aldrin/dieldrin tolerances prescribed by the Food and Drug Administration (FDA) in fish. Aldrin/dieldrin has been shown to bioaccumulate by as much as 100,000-fold in fish. Applying this factor to the FDA tolerance level of 0.3 ppm established for fish yields a concentration ceiling of 0.003 ug/1 in order to avoid exceeding that tolerance. The FDA tolerance is discussed in *United States of America* v. *Ewig Bros. Co., Inc.*, 502 F.2nd 715, n. 31 (7th Cir. 1974).

(8) *Control Technology Available to Manufacturers and Formulators.* Since Shell Chemical Company was the last producer of aldrin and dieldrin and disposed of its wastes in an evaporation pond, little additional research effort has been directed towards alternative treatment facilities. Shell's operation of a lined pond apparently provided effective control, eliminating any direct discharge to the navigable waters. In light of the toxicity data discussed above, any new manufacturer should be required to take advantage of location selection so that evaporation would be a viable means to achieve zero liquid discharge. Similar control technology appears to be available to formulators as well.

Estimates have indicated that a potential domestic market of about 1 million pounds of aldrin with possibly some dieldrin can be developed, particularly if

the use of other pesticides is restricted in such areas as subterranean termite control. In light of this potential market as well as the export market, standard setting is appropriate under section 307 (a) of the Act despite the present limited activity in the manufacturing and formulating of compounds containing aldrin and dieldrin.

Midwest Research Institute (MRI), in studying the control technology, concluded that the lined pond, or lagoon, is feasible for manufacturers.

Formulators employ technologies which are essentially devoid of water use. With the use of roofing, diking, and diversion structures, process-related runoff can be eliminated as a pollution source.

MRI's cost estimates, based upon the potential domestic market described above, are that a small but sufficient evaporation pond would cost approximately $24,100 to install and $5610 per year to operate. Assuming an annual production rate of 1,000,000 pounds of aldrin, this would amount to $12.30 per thousand kilograms produced.

Costs for formulators depend on size of plant and other variables. Costs for roofing and other runoff control measures are estimated to range from $1000 to $4000.

It is expected that evaporation pond technology will not result in significant adverse non-water quality environmental impact, provided that proper care is used in the location, construction, and operation of such a pond.

(9) *Economic Impact*—(a) *Manufacturers.* Currently, there are no manufacturers of aldrin/dieldrin in the United States who discharge to the navigable waters, and due to FIFRA restrictions it appears unlikely that new manufacturing plants will be constructed. If a new plant were to be established, a closed system such as that previously operated by Shell would provide an economically feasible means of compliance. Although accurate costs for a new system which considefs opportunities for flow reduction and other in-plant abatement methods are unavailable, the costs experienced by Shell provide a rough upper bound. Thus, the projected capital cost is about $25,000 with an annual operating cost of about $6,000 which equates to $0.006 per pound of aldrin for a 1 million pound plant or 0.6 percent of the current selling price. It is estimated that this additional cost could be passed on as a price increase without significant impact on production or use of the pesticides.

No information was available for assessing potential economic impact in regard to sources who may use this pesticide as a material in the production, preparation, or processing of another synthetic organic substance (other than formulators of this pesticide).

(b) *Formulators.* The assessment of potential economic impact for formulators was carried out for all formulators of the four pesticides together rather than separately for each pesticide. The general conclusion is that there will be no significant costs of compliance, and, therefore, no significant impact on either the formulators or the consumers of their products.

This finding is based on a telephone survey conducted by the economic contractor in which 16 companies operating 32 plants (of the approximately 145 plants believed to currently formulate these products) were contacted. The respondents believed that they are currently in substantial compliance with the proposed prohibition on discharge and that no significant additional costs would be incurred. The economic contractor expects that this finding is generally valid for the formulator industry.

Compliance with the proposed standards is achievable by enclosure of formulation operations to preclude contaminated runoff and disposal of spilled material or washwater. As indicated in the control technology discussion above, EPA estimates that adequate enclosure can be accomplished by the installation of roofing, curbing, and flooring at an annual cost of approximately $1000 to $4000 depending on plant size. Although survey results indicate that these costs will not generally be incurred by formulators, it can be assumed that such costs, if necessary, would fall most heavily on those formulators whose output of the 307(a) pesticides is small in absolute terms (i.e., the cost is large compared to sales volume) but large relative to total output of all pesticides (i.e., the line could not be dropped without potentially serious profit impact). In order to roughly determine the number of plants which might fit this set of conditions, a cost-to-price ratio of 5% or greater and a 307(a) pesticide-to-total output ratio of 5% or greater were selected as criteria which might reasonably define such a set of plants. The application of these criteria indicates that less than 20 plants might fit the specified conditions.

(10) *Rationale for Standards.* Because of the demonstrated toxicity of aldrin/dieldrin to aquatic and other organisms at low concentrations, its persistence in the environment, and the cancer threat posed to man, a prohibition on discharge is proposed for manufacturers and formulators.

In proposing this prohibition the Administrator considered the feasibility of compliance. In this regard the absence of any existing manufacturer, and the fact that the last active manufacturer achieved no discharge using the technology described above, indicates that this standard can be complied with without undue hardship to the industry. Any new manufacturing source reasonably can be expected and required to locate its plant in an area which allows utilization of the evaporation technology employed by the last active manufacturer, or to utilize any additional technology which may be available to achieve zero discharge.

With respect to formulators, a prohibition is likewise feasible. EPA studies have shown that: (1) Formulator operations generally use only small amounts of water, principally related to cleanup; and (2) complete containment of aqueous wastes related to pesticide formulation is an installed, demonstrated practice. Contaminated rainwater runoff can be avoided by enclosure.

B. DDT (DDD, DDE)

(1) *Nature and Use; Manufacture and Formulation; Wastewater Characteristics.* DDT [1,1,1-trichloro-2,2-bis(p-chlorophenyl) ethane and some o,p'-isomers] is a chlorinated hydrocarbon pesticide which has been widely used for the spraying of crops, including notably cotton and tobacco. It has also been used extensively as a household insecticide. Since DDT is almost insoluble in water and is readily sorbed, it tends, in aquatic systems, to associate with particulate material. Because of its high lipid solubility and resistance to degradation, it accumulates in the fatty tissues of aquatic organisms. Its closely associated metabolities, DDD and DDE, are included in the coverage of this regulation, and are collectively referred to as "DDT."

DDT is manufactured presently at only one plant in the United States, the Montrose Chemical Corporation at Torrance, California. It has been estimated that the 1975 production of DDT at this plant was about 60 million pounds, and current production levels appear to be in excess of that. The present sales price for technical grade DDT is about 50¢ per pound. The rate of production for 1976 and 1977 is expected to approach the plant's presently estimated capacity of approximately 85 million pounds per year. Montrose sells technical grade DDT and formulated products to the World Health Organization and the Agency for International Development, as well as directly to foreign nations in both the northern and southern hemispheres.

The Montrose manufacturing plant operates on a three shifts per day, seven days per week basis except for routine maintenance or breakdowns in operating equipment. The company reports on-stream time each calendar year of about 360 days.

The continuous manufacturing process involves the condensing of monochlorobenzene and chloral in the presence of concentrated sulfuric acid. The reaction is kept below 30 degrees celsius and takes place at atmospheric pressure in a stirred reactor system. DDT recovery is by crystallization. Impure DDT crystals are first washed with caustic solution, and then unreacted monochlorobenzene is removed by melting the crystals and bubbling steam through the melt. The purified crystals are then dried and flaked.

Wastewater flow at the Montrose plant is contained within the plant by a closed loop processing system and the use of a sealed bottom holding-recycling pond. Recycle water typically contains 10 to 15 mg/l DDT. Montrose currently segregates about 30,000 gallons/day of alkaline DDT wastes. These wastes are currently removed by truck and placed in a California approved Class I dump. Wastewater from vent scrubbers and surface drainage from the plant area are collected in a holding-recycling pond and recycled to the process. This pond serves

as a surge capacity for the cooling water system.

At present the liquid waste streams segregated in the DDT plant average about 40,000 gallons/day: 30,000 gallons from the caustic liquor DDT washer and miscellaneous sources, and 10,000 gallons of the so-called acid waste which contains spent hydrochloric and sulfuric acids, monochlorobenzene, sodium monochlorobenzene sulfonate, chloral sodium hydroxide, and sulfonic acid derivatives.

Montrose believes that their offsite waste disposal operations may have to be discontinued in the near future because of the complete utilization of acceptable landfill areas. Montrose is therefore investigating alternative methods for treatment and disposal of their process waste.

At present, the composite wastes from the plant contain approximately 60 mg/l DDT, 60 mg/l DDD and 70 mg/l DDE for a total output of approximately 39 lbs/day of DDT and its degradation products. Although there is no present direct discharge to the navigable waters, there could be in the future in light of exhaustion of available landfill sites and the resulting needs for alternative disposal practices.

There is no formulator of DDT known to the Agency at this time with a direct discharge of DDT to the navigable waters. According to FIFRA registrations there is only one company other than Montrose currently engaged in DDT formulation.

(2) *FIFRA Proceedings.* DDT and its derivatives are among the most widely distributed synthetic chemicals on earth. They are found in soils, runoff water, air, rainwater, and in the tissues of animals. Basic characteristics of DDT include persistence, mobility, and a broad range of toxic effects. Because of these toxic effects and the cancer risk to man posed by DDT, most uses of this pesticide were cancelled by the Agency in FIFRA proceedings on June 14, 1972, 37 FR 13369.

In his decision the Administrator stated that he was "persuaded • • • that the long-range risk of continued use of DDT for use on cotton and most other crops is unacceptable and outweighs any benefits." 1972 Order, 37 FR 13369. The Administrator found that "once dispersed, DDT is an uncontrollable, durable chemical that persists in the aquatic and terrestrial environments." 1972 Order, 37 FR 13370. He concluded that DDT was "highly volatile" (37 FR 13370 n. 16) and "transported by drift during aerial application" as well as by runoff (*Id.*, n. 13). He found that, "Given its insolubility in water and its propensity to be stored in tissues, it collects in the food chain and is passed up to higher forms of aquatic and terrestrial life." (*Id.* at 13370). He further found that DDT "can persist in the soils for years and even decades" and "can persist in aquatic ecosystems" (*Id.* at 13375). As a result of its persistence and mobility, the Administrator found that DDT is "concentrated in organisms and transferred through food webs," that DDT "accumulation in the food chain and crop residues results in human exposure," and that "human beings store DDT" in their tissues (*Id.* at 13375).

The Administrator also found that DDT poses hazards to birds, fish and other animal life:

1. DDT affects phytoplankton species' composition and the natural balance in aquatic ecosystems.
2. DDT is lethal to many beneficial agricultural insects.
3. DDT can have lethal and sublethal effects on useful aquatic freshwater invertebrates, including arthropods and molluscs.
4. DDT is toxic to fish.
5. DDT can affect the reproductive success of fish.
6. DDT can have a variety of sublethal physiological and behavioral effects on fish.
7. Birds can mobilize lethal amounts of DDT residues.
8. DDT can cause thinning of birds' eggshells and thus impair reproductive success. (Id at 13375).

With respect to human health, the Administrator found that "DDT causes tumors in laboratory animals," that "there is some indication of metastasis" of such tumors, that "tumor induction in mice is a valid warning of possible carcinogenic properties," that there are "no adequate negative experimental studies in other mammalian species," and that for obvious reasons one cannot run experiments on human beings to gather such data. Accordingly, the Administrator found that DDT poses a cancer risk to man. (Id at 13375).

The Administrator's cancellation order was upheld by the U.S. Court of Appeals for the District of Columbia Circuit in 1973, *Environmental Defense Fund* v. *EPA*, 489 F. 2d 1247 (D.C. Cir. 1973). Subsequently, in reviewing a petition by the State of Louisiana for reconsideration of this order, the Administrator reaffirmed it, finding that recent data strengthened and confirmed the findings on which the prior order was made. 40 CFR 15934 *et seq.* (April 8, 1975).

Notwithstanding the cancellation of most uses of DT under FIFRA, pesticides utilizing DDT will continue to be produced and formulated in this country as long as demand for them continues in other parts of the world. Therefore, limits that protect all receiving water uses must be placed on DDT in effluents of plants that produce and formulate these pesticides.

(3) *Toxicity.* Toxic effects resulting from the presence of DDT in water have been documented for aquatic organisms representing a wide phylogenetic cross section and geographic distribution. A review of published toxicity data shows that DDT causes adverse effects on primary producers, and that 96-hr LC50 values as low as 0.12 ug/l have been demonstrated for some invertebrates. Fish have died from a four-day exposure to 0.4 ug/l. Birds have died from as little as 415 mg/kg of DDT in their feed.

Examples of important aquatic invertebrates and their 96-hr LC50 values are: 2 species of scuds, 0.8 μg/l and 1.0 μg/l; sand shrimp, 0.6 μg/l; and crayfish, 0.24 μg/l. For the pink shrimp a 28-day TL50 (LC50) of 0.12 μg/l has been reported. 96-hr LC50 values reported for fish include: Atlantic silverside, 0.4 μg/l; striped mullet, 0.9 μg/l; striped killifish, 1.0 μg/l; largemouth bass, 2 μg/l; and brown trout, 2 μg/l. These fish species are widely distributed in the fresh and marine waters o fthe United States. An amphipod widely distributed throughout the waters of the United States has a 48-hr EC50 for DDT of 0.36 μg/l.

DDT has resulted in numerous fish-kills in various parts of the United States. DDT has also been implicated as the cause of blindness as well as abortions among fish which survived relatively high levels of the toxicant, and death of fry of exposed mothers when residues of DDT–DDD in the eggs exceeded 4,750 μg/kg.

With respect to mammals, LD50 values in the range of 100–500 mg/kg of body weight have been reported for several species. In long-term studies, monkeys fed 50 mg/kg of body weight/day at first showed signs of intoxication, followed by apparent recovery. However, between the 4th and 14th weeks of the experiment, all died. In rabbits, a dosage of 50 mg/kg/day caused premature delivery of young and an increased number of resorptions. A dose of 12 mg/kg/day lowered the reproductive ability of beagle dogs. Effects noted in the dogs included reduced libido, stillbirths and lack of mammary development, with reduced milk production.

Chromosomal abnormalities (primarily deletions and stickiness) have been reported in mice at dosages of 150 ppm or higher in the diet. Further evidence of the mutagenic potential of DDT, DDD and DDE comes from *in vitro* studies with kangaroo rat cell lines, in which concentrations as low as 10 μg/l of p,p'-isomers of DDT, DDD and DDE in the medium caused cell damage. Administration of 46.4 mg/kg of body weight to two strains of mice maintained on a diet containing 140 ppm resulted in a 50% incidence of hepatomas in 36 males and a 14% incidence in 36 females. In 169 control animals of both sexes, the incidence of hepatomas was 7 percent.

Bald/c mice were fed 2.8 to 3 ppm DDT for six months and were observed for an additional 20 months. In the test group of 684 mice, tumors developed at an incidence greater than in the controls. The DDT-fed group showed a greater incidence of leukemia and malignant tumors than the controls of F1 and F2 generations. The accumulated DDT content in the fatty tissues of the experimental group amounted to 7 to 11 mg/kg—levels comparable to those found in the fatty tissues of urban human populations.

A 1972 study on CF–1 mice fed DDT over their entire lifespans for two generations at concentrations of 2–250 ppm showed an increase at the 10 and 50 ppm levels and a marked increase at 250 ppm. Both age at death with liver tumors and incidence of liver tumors were dose related. An earlier study which used

p,p'-DDT on still another strain of mice produced similar findings.

Russian scientists, in a multi-generation study using A-strain mice fed 10 and 50 ppm DDT in the parent generation and 10 ppm in five succeeding generations, found an increase in lung tumors in all five succeeding generations. A Hungarian report presented data showing that DDT caused a significant increase in leukemia and malignant tumors at several different sites in the second through the fifth generations of mice fed approximately 3 ppm DDT in the diet.

In March 1974, long-term feeding studies of p,p'-DDE, the principal metabolite found in all humans, were reported. At the only feeding level tested (250 ppm), p,p'-DDE was an extremely effective liver carcinogen in both males and females, with a 98 percent incidence of tumors in the females, compared to a one percent incidence in the control animals.

(4) *Human Health Effects.* DDT poisons man primarily by attacking the central nervous system, including the cerebellum and the higher motor cortex. Sensations such as prickling, burning, or itching, as well as tumors or convulsions may follow exposure to appreciable amounts, as well as irritability, nervous tension and fatigue. It also attacks the adrenal gland.

As previously discussed, experimentation with mammals has led to the conclusion that DDT is a potential carcinogen which poses a substantial human health hazard.

(5) *Persistence; Degradability.* DDT is highly persistent. It has been shown to persist in soil for at least 17 years, and persists for many years in the aquatic environment as well. DDT may be transported to water bodies by direct discharges from manufacturing plants, by drifting air sprays applied over fields, and by runoff from treated soils. It accumulates in sediments, suspended particulate matter and living organisms. When it reaches the surface of a water body, it tends to enter the atmosphere by co-distillation with water, thereafter to be transported worldwide by wind and rain.

(6) *Bioaccumulation.* Aquatic organisms are often extremely efficient at concentrating DDT from low ambient water levels to much higher levels in their tissues. Bioaccucmulation of DDT residues as much as two million times ambient water concentrations occur in fish. The oyster has been reported to concentrate DDT by a factor of 70,000. When DDT was applied directly to an estuarine water, residues of 1 part per billion (ppb; equivalent to 1 μg/l) were found in the water, 15,000 ppb in fish and 800,000 ppb in the porpoise. Sediments in Lake Michigan have been found to average 14 ppb DDT and DDE. An amphipod in the Lake had levels of 410 ppb, while fish had levels 10 times higher, and the concentration of DDT in breast muscle from gulls averaged 27 times that of the concentration in lake alewives. Gull fat had a concentration of 2,441 ppm DDT.

Studies with brook trout have shown that a major source for DDT accumulation can be the food web rather than uptake from water. Thus, the fact that the food organism, *Daphnia magna*, can concentrate DDT to 16,000 to 23,000 times water concentration within 24 hours has highly significant implications for the rest of the food web. In a model ecosystem laboratory study, it was found that mosquito larva, fish and snails concentrated DDT (as DDT, DDD or DDE) from 10,000 to 100,000 times.

From the foregoing it can be seen that DDT and its metabolites accumulate in aquatic food chain organisms, thus becoming available to higher carnivores, including man.

(7) *Criteria Formulation.* An ambient water criterion of 0.001 μg/l is recommended for protection of aquatic life. In addition, due to the demonstrated carcinogenic activity of DDT every reasonable effort should be made to minimize human exposure.

DDT in water has been shown to be acutely toxic to aquatic vertebrates at 0.12 μg/l. DDT also has been observed to accumulate in fish tissue to levels two million times those of the ambient water. Mice exposed to 2 mg/kg of DDT in their feed (the lowest dose tested) developed hepatic tumors. Recognizing that 2 mg/kg of DDT in a diet has been demonstrated to cause tumors in mice, the concentration of DDT in aquatic organisms should be less than 2 mg/kg to protect consumers of aquatic organisms. Since bioaccumulation by factors as high as two million has been demonstrated, a level of 0.001 μg/l in water could produce concentrations as high as 2 mg/kg in fish flesh. Thus, even at a water concentration of 0.001 μg/l some adverse effects might be expected among animals preying on aquatic organisms.

In man, tissue concentrations can reach levels which cause adverse physiological reactions, including the potential for carcinogenesis. Since there is no demonstrated "no effect" level for carcinogens, and in light of the bioaccumulation potential of DDT, all human exposure should be minimized.

(8) *Control Technology Available to Manufacturers and Formulators.* The only presently operating domestic manufacturer of DDT, Montrose Chemical Company, disposes all liquid wastes to a landfill. With the landfill nearing capacity, Montrose is exploring alternatives, including preatreatment. Montrose has been awarded an EPA grant in conjunction with the Envirogenics Systems Company to evaluate a scheme of treating the alkaline portion of the DDT waste stream which constitutes about three quarters of the total wastewater discharged. It is presumed that acid waste would still be landfilled. The grant application identified a technology which consists of a liquid-liquid extraction using a high shear extraction loop with monochlorobenzene as a solvent. Following either single or double stage extraction, and activated carbon treatment, the wastewater would be discharged to the Los Angeles County sewage system, while the DDT-laden solvent would be processed to recover the solvent. The recovered solvent would be returned to the manufacturing process while the residue would be treated by a Fridel-Crafts destruction system. Bottoms from the Fridel-Crafts reaction would then be either landfilled or possibly incinerated.

The aqueous phase discharge from the extraction loop is estimated to contain about 1 μg/l of DDT and DDD and 30 μg/l of DDE in conjunction with a small amount of monochlorobenzene. This wastewater could be treated subsequently by activated carbon to remove essentially all the monochlorobenzene and reduce the total cumulative DDT, DDD, and DDE concentration to approximately 1 μg/l. The system contemplated for Montrose is for pretreatment at the present time, and not for discharge to any navigable water.

For new manufacturing sources, an evaporation pond similar in concept to that used by Shell Chemical for aldrin/dieldrin could be employed for DDT wastes. Such a system would require selection of a location with a suitable climate and underlying geologic conditions.

By use of control technology similar to that employed by aldrin/dieldrin formulators, DDT formulators can achieve no discharge.

(9) *Economic Impact*—(a) *Manufacturers.* Currently, there are no manufacturers of DDT discharging directly to the navigable waters. However, if a new direct-discharging plant were to be established, it is assumed as indicated above, that compliance could be achieved using a closed system similar to that of the former Shell aldrin/dieldrin plant. Thus, the projected capital cost is about $25,000 with an annual operating cost of about $6000 or $0.00012 per pound of DDT (at an assumed output of 50 million pounds) equivalent to 0.02 percent of current selling price. It is estimated that this additional cost could be passed on as a price increase without significant impact on production or use of the pesticide.

No information was available for assessing potential economic impact in regard to sources who may use this pesticide as a material in the production, preparation, or processing of another synthetic organic substance (other than formulators of this pesticide).

(b) *Formulators.* The assessment of potential economic impact for formulators was carried out for all formulators of the four pesticides together rather than separately for each pesticide. The reader is referred to the discussion of economic impact on formulators presented for aldrin/dieldrin.

(10) *Rationale for Standards.* Because of its toxicity to a wide range of organisms at low dosage levels, its persistence and mobility in the environment, and its cancer risk to man, a prohibition on discharge is proposed for all manufacturers and formulators of DDT, both existing and new sources. Based upon the information available at this time to the Administrator, compliance with this standard is feasible in light of the absence of any known present direct discharger to

the navigable waters, and the availability of evaporation technology for new sources.

The prohibition on discharge proposed herein is predicated on two facts: first, there is no direct discharge to navigable waters at the present time; and second, any potentially new manufacturer or formulator of DDT would have the opportunity to select a site where total waste evaporation would be available, and achieve zero discharge.

C. ENDRIN

(1) *Nature and Use; Manufacture and Formulation; Wastewater Characteristics.* Endrin (1, 2, 3, 4, 10, 10-hexachloro-6, 7, -epoxy-1, 4, 4a, 5, 6, 7, 8, 8a-octahydro-1, 4-endo, -5, 8-endo-dimethanonaphthalene) is one of the chlorinated cyclodiene pesticides.

Since it is non-polar, endrin dissolves more readily in fats than in water, a property common to organic pesticides which bioaccumulate. Like other non-polar molecules in the environment, endrin can be strongly adsorbed by particulate matter, a property of considerable importance in its distribution between the water and sediments of receiving water bodies.

The Velsicol Chemical Corporation plant at Memphis, Tennessee, is the sole manufacturer of endrin in the United States. This facility uses a Diels-Alder reaction of hexachlorocylopentadiene with vinyl chloride. The plant operates 24 hours/day, 7 days/week with production steady throughout the calendar year. It has been estimated that Velsicol produces endrin at an annual rate of about 6 million pounds. At the present time Velsicol is discharging 3 waste streams: two of these, consisting of plant runoff and cooling water amounting to approximately 1,000 gallons/minute and containing about 0.07 lbs/day endrin, are discharged to the navigable waters, while the principal industrial waste stream of about 2,500 gallons/minute with 80 μg/l of endrin contributing about 2.4 lbs/day endrin is discharged to the Memphis sewerage system. Velsico therefore qualifies as a direct discharger to the navigable waters and is also subject to any applicable pretreatment regulations.

The status of the formulating industry is quite dynamic and the number of formulators varies from year to year. There are 39 currently active formulators with endrin registrations on file with EPA. Endrin is principally formulated as an emulsified concentrate with about 90 percent of the total products being of that nature. Wettable powders and granules constitute the remaining 10 percent of the products that are formulated.

The Midwest Research Institute, under contract with the Agency as noted above, reports that while 39 firms were registered as formulators of endrin, only three were listed in the 1975 *Farm Chemical Handbook* as actually formulating. One of these, Velsicol, both manufactures and formulates endrin. The two other formulators of endrin are located in Florida and achieve zero discharge of process wastewater.

(2) *Toxicity.* Many incidents of endrin-related fishkills have been reported. The types of fish killed have ranged from game fish such as the crappie and bluegill, to non-game fish important in the food chain such as the mosquitofish.

The brown pelican population in the lower Mississippi valley began to decline when endrin was re-introduced to the area in 1974 for cotton insect pest control. Chemical analysis of the brains of dead birds revealed levels of endrin which could account for their deaths. The brown pelican is a fish predator and would receive endrin by way of the food chain, as demonstrated by Rosato and Ferguson in 1968 when consumption of endrin-resistant mosquitofish loaded with endrin resulted in the death of "predators."

Toxic effects resulting from the presence of endrin in water have been documented for aquatic organisms representing a wide phylogenetic cross section and a wide geographic distribution. While all test organisms used may not be universally distributed in the waters of the United States, they do represent organisms present in fresh, marine and estuarine systems thoughout the country. Extrapolation from the effects found in laboratory and field tests is a reliable means for predicting effects of endrin on individual organisms and their food chains and is recognized as such by the scientific community.

A review of published toxicity values shows that endrin is extremely toxic to many fish and to invertebrate species such as stoneflies and shrimp. Endrin is also acutely toxic to birds and mammals. Human poisoning resulting from accidental consumption of endrin-contaminated food also has been reported.

Endrin toxicity values for invertebrate species extend below the one microgram per liter range. The species tested are found distributed widely in fresh or marine waters and some are important human food organisms. Examples of important species and their 96-hour LC50 values are: 0.037 ug/l for the pink shrimp using the flow-through bioassay; and 3.0 ug/l for the scud; 0.25 ug/l and 0.32 ug/l for two species of stoneflies in static bioassays. A 30-day LC50 of 0.035 ug/l has been reported for the nalad of a stonefly species.

The 96-hour TLm (LC50) values for a variety of freshwater fishes have been reported to range from 0.27 μg/l for coho salmon to 0.048 μg/l for chinook salmon. Other researchers have reported the 96-hour TLm values for chinook salmon, coho salmon, and rainbow trout as 1.2, 0.51, and 0.58 μg/l, respectively. The 96-hour TLm for bluntnose minnows has been reported to be 0.27 μg/l. The bluegill was reported as having a 96-hour TLm value of 0.6 μg/l, while the striped bass has been shown to have a 96-hour LC50 of 0.94 μg/l. A 36-hour TLm study on the black bullhead catfish disclosed a value of 0.37 μg/l. These fish species are widely distributed throughout the fresh waters of the United States.

Marine or estaurine studies also have been conducted using a variety of species representative of coastal United States waters. It has been reported that the static 96-hour TLm (LC50) values vary from 0.3 μg/l for the striped killifish to 3.1 μg/l for the Northern puffer. Further, static 96-hour TLm values of 0.44 and 0.50 μg/l for marine threespine sticklebacks in waters of 5 and 25 parts per thousand salinity, respectively, have been reported.

Birds as well as mammals are very sensitive to endrin poisoning. For example, the LD50 for mallard ducks has been shown to be 5.6 mg/kg. The oral LD50 of endrin to a standard laboratory test animal, the Sherman rat, has been shown to range from 1.8 to 43 mg/kg of body weight.

(3) *Human Health Effects.* Endrin has been reported to cause convulsions or death in humans following consumption of contaminated foods, inhalation or sorption. A compilation of data developed by the Commission of the European Communities details the cases both in the United States and abroad. It was reported that convulsions begin at blood levels of 0.053 μg/ml. However, there is a rapid elimination of endrin from the blood.

(4) *Persistence; Degradability.* Endrin may be transported to water bodies by direct discharges from manufacturing plant effluent pipes, by drifting air sprays applied to fields, and by runoff from treated soils. Once in the aquatic environment it can persist in the water column, or may enter sediments. It has been shown to persist for at least 14 years in soil and as long as nine years in water.

(5) *Bioaccumulation.* Plants or animals may bioaccumulate endrin. Transfer of endrin from water to organism or sediment, or from organism to organism has been shown to occur. Endrin-resistant strains of food organisms have been shown capable of transferring lethal doses of the pesticide to fish, reptiles or birds. Bioaccumulation levels in fish found in nature have been reported as high as 12,000 ug/kg of dry body weight, while 214,000 ug/kg (428 times the water concentration) has been achieved in resistant fish living in the laboratory.

Fathead minnows exposed to 0.015 ug/l had total body concentrations 10,000 times greater than the water. Residue accumulation up to 10,000-fold was observed in flagfish exposed for 60 days to several concentrations between 0.05 and 0.3 ug/l.

The concentration of endrin in adult medaka tissue has been found to be 17,000 to 26,000 times the water concentration. This degree of accumulation is based only on observations of uptake directly from the water and does not allow for accumulation via the food chain or significantly higher accumulation rates possible in other, untested fish species.

(6) *Criteria Formulation.* Endrin is extremely toxic to important aquatic invertebrates such as shrimp, which are consumed by other aquatic organisms and by man, and to lower species such as stoneflies, which serve as food organisms

for higher aquatic life forms. It is also extremely toxic to such fishes as the coho salmon, the chinook salmon, and rainbow trout, all of which are consumed by man in commercially important quantities.

Endrin degrades more rapidly than DDT and aldrin/dieldrin, and is eliminated from the body more rapidly than either of those substances or toxaphene. At the same time, it has been shown to bioaccumulate in fish flesh by factors as high as 26,000. Research with the flagfish has shown that the safe to lethal ratio, or application factor, for exposure to endrin lies between 0.26 and 0.35 of the 96-hour LC50. Complete life-cycle studies with the sheepshead minnow indicate that a safe to lethal ratio is about 0.3 of the 96-hour LC50. These results indicate that use of the National Academy of Sciences' application factor of 0.01 would be overly protective in the case of endrin, and that an application factor of 0.1 will assure adequate protection.

Based upon the 0.037 μg/l 96-hour LC50 value for the commercially important pink shrimp, and the 0.048 μg/l 96-hour LC50 value for the chinook salmon, the aforesaid application factor yields an ambient water criterion of 0.004 μg/l.

(7) *Control Technology Available to Manufacturers and Formulators.* Three independent systems were identified for potential application to the Velsicol endrin process waste. These processes were adsorption on polymeric resins, e.g., the Rohm and Haas XAD–4 resin; reductive degradation, which is a process identified by the Envirogenics Company which uses iron as the reducing compound and a copper catalyst; and adsorption on activated carbon. These processes were evaluated independently since there are some data available on the Welsicol wastes for resin adsorption and reductive degradation and some data available in the literature on carbon adsorption isotherms for endrin from which estimates could be made on the proper size treatment facilities for Velsicol.

EPA has awarded a research and development grant to Velsicol Chemical Corporation to evaluate, on a pilot plant scale, the resin adsorption system and reductive degradation system, both individually and in series, to determine the treatment efficiency of these systems. The preliminary data based on laboratory scale systems indicated that resin adsorption by itself reduced endrin to approximately 1.4 μg/l, while the reductive degradation system reduced endrin to approximately 1 μg/l. With the two systems in series, endin could be reduced to 0.1 μg/l. Carbon adsorption was estimated to be capable of reducing enrin to about 2 μg/l using a reasonable design contact time.

By use of controls similar to those used by aldrin/dieldrin and DDT formulators, endrin formulators can achieve no discharge.

(8) *Economic Impact*—(a) *Manufacturers.* The sole endrin manufacturer is both a direct and an indirect discharger and is, therefore, subject to both toxic pollutant effluent standards and pretreatment standards. While the major stream of polluted wastewater is discharged indirectly, the economic impact of the cost of treatment for all streams is considered here under the presumption that Section 307(a) regulations will be issued and require compliance sooner than standards for dischargers to publicly owned treatment works (sometimes referred to as "indirect dischargers") pursuant to Section 307 of the Act. The treatment technologies are available for both direct and indirect dischargers and the costs, as developed by MRI, are applicable in either instance. The Agency presently expects to propose pretreatment standards for endrin requiring approximately the same limitations on discharges based upon the same technologies as set forth herein. As indicated in paragraph (7) above, the discharger could achieve compliance with either the resin adsorption or the reductive degradation system.

For impact assessment we have examined the less costly system, reductive degradation, assuring the discharger would be expected to elect the lesser cost system. According to the MRI data, the projected additional capital cost is $242–362 thousand and the additional annual operating cost is $109–161 thousand or $0.02–0.03 per pound of endrin produced which represents 0.6–0.9 percent of the selling price of endrin. It is estimated that this additional cost could be passed on as a price increase without significant impact on production or use of the pesticide. For a new source, compliance with the more stringent standard would require use of the resin adsorption and reductive degradation systems in series. The new source cost based on a 6 million pound plant would be approximately $1.5 million investment and $1.2 million annual operating cost or $0.20 per pound. This cost is considered a "worst case" since it does not include further flow reductions or other in-plant modifications available to a new plant. This additional cost, which represents 6.7 percent of the current selling price, could probably be absorbed or partially passed on as a price increase without significant impact on the production or use of endrin.

No information was available for assessing potential economic impact in regard to sources who may use this pesticide as a material in the production, preparation, or processing of another synthetic organic substance (other than formulators of this pesticide).

(b) *Formulators.* The assessment of potential economic impact for formulators was carried out for all formulators of the four pesticides toegther rather than separately for each pesticide. The reader is referred to the discussion of economic impact on formulators presented for aldrin/dieldrin.

(9) *Rationale for Standards.* The ambient water criterion for endrin was determined to be 0.004 μg/l. Although an effluent discharge of that concentration level would provide an ample margin of safety even for organisms located at the immediate outfall over a 96-hour period, there does not appear to be an available control technology to achieve this level in an effluent stream. Technology would appear, however, to be capable of achieving a concentration of 0.1 to 1 μg/l based upon laboratory data. In actual practice it appears reasonable to expect that the reductive degradation system or the resin adsorption system could achieve at least 1.5 μg/l and, if used together, even lower levels can be expected. A standard of 1.5 μg/l, given the usual dispersion factors following discharge, would appear to provide an ample margin of safety for important organisms which might be affected by the discharge. This concentration is proposed as a monthly average standard for existing dischargers.

A maximum concentration level of 7.5 μg/l in samples representing any working day will provide safety against acute toxic effects from a single "dose" or "slug" in excess of the monthly average. An overall weight limit of 0.0003 kg/kkg of production will provide a reasonable overall limitation on the amount of endrin placed into the environment from such sources.

For new manufacturing point sources, time exists to plan for even better technology, which can in turn be expected to provide an even greater margin of safety than that required of existing sources. This would include, for example, the use of resin adsorption plus reductive degradation to achieve a concentration level of 0.1 μg/l. This then is proposed as the average monthly concentration with a weight loading maximum of 0.00002 kg/kkg of production, and a maximum concentration level of 0.5 μg/l in samples representing any working day.

The mass emission loadings for the pesticide manufacturers were calculated by using existing flows at a selected plant multiplied by the average concentration specified in the standards and by a conversion factor to yield kg per day. The average daily production was determined by providing the maximum estimated annual production (in kg) by the number of operating days per year if known, or by 360 if not known. The allowable pollutant emission per unit of production was then calculated by dividing the average daily mass emission by the estimated average daily production.

In the case of endrin manufacturing, the specified parameters were taken from those of the Velsicol plant. The average concentration was 1.5 μg/l for existing sources and 0.1 μg/l for new sources, the flow selected was 300 gallons per minute (gpm), and the annual production was 6 million lbs of endrin.

The intention of the Agency in including such a mass emission rate is the avoidance of the sole application of dilution by a discharger in lieu of actual reduction either by in-process changes or by add-on treatment or both. Although toxic effects are basically concentration-related, the Agency believes that one objective of section 307(a) is to minimize the discharges of toxic pollutants regardless of concentration.

For formulators, a prohibition of discharge is proposed, since this provides the maximum degree of safety and appears to be feasible. The Agency does not have any information indicating that this would cause undue hardship to any formulators.

There may be some instances where receiving water conditions are such that a discharge at the level proposed in this standard may result in a cronic or ambient concentratoin of endrin in the receiving waters in excess of 0.004 μg/1, owing to discharges from other sources, or hydrologic or hydrographic conditions, or both, even beyond the area of a reasonable mixing zone. The "tightheningˮ variance established in § 129.7 of these regulations is available to the permit issuing authority to require a more stringent limitation in order to achieve or contribute to the achievement of the desired concentration level. An alternative authority which may be utilized to achieve the same objective is that established in section 301(b)(1)(C) of the Act, expressly preserved in § 120.5(e) of these regulations, which requires a more stringent limitation wherever needed to meet applicable water quality standards or other requirements of law. The Agency expects that the States will, in due course, establish such water quality standards pursuant to Section 303 and, where applicable, section 208 of the Act.

D. TOXAPHENE

(1) *Nature and Use; Manufacture and Formulation; Wastewater Characteristics.* Toxaphene is defined as chlorinated camphene (67–69 percent chlorine) and has the empirical formula C(10)H(10)Cl(8) with an average molecular weight of 414. Toxaphene is commercially produced by reacting camphene and chlorine in the presence of ultraviolet radiation and certain catalysts to yield the final chlorinated camphene product. Like other chlorinated hydrocarbon pesticides in the aquatic environment, toxaphene degrades slowly and bioaccumulates in fatty tissue of animals.

There are four manufacturers of the generic compound toxaphene in the United States: the Hercules, Inc. plant at Brunswick, Georgia; the Tenneco Chemicals, Inc. plant at Fords, New Jersey; the Vicksburg Chemical Company plant in Vicksburg, Mississippi; and the Riverside Chemical Company, at Groves, Texas.

Estimates of production figures for toxaphene indicate that Hercules produces 50 to 80 million pounds/year, Tenneco produces 10 to 11 million pounds/year, Riverside produces 12 to 14 million pounds/year, and Vicksburg produces 9 to 11 million pounds/year.

Comparisons among the plants indicate substantial differences in wastewater flow rates. Such differences are caused by both the sales of by-product muriatic acid and the type manufacturing process employed.

Of the manufacturers, only Hercules, Inc. has installed treatment at the present time. Hercules provides neutralization by use of a limestone containing substantial clay impurities. The clay impurity is designed to provide surface area for adsorption of toxaphene. The mixture is put through settling lagoons, then mixed with other effluents from the manufacturing complex and discharged to a small creek before going into St. Simon's Sound. Hercules currently discharges about 114 μg/1 of toxaphene in about 2.4 million gallons of treated water per day.

Tenneco Chemicals, Inc. sells by-product muriatic acid and discharges very small amounts of liquid waste (about 100 gallons/day) with a claimed concentration of toxaphene of less than 5 μg/1. This discharge goes to the Middlesex County Sewer system for subsequent treatment.

Vicksburg Chemical Company is a direct discharger to the Mississippi River. Discharges from this plant amount to some 14,000 gallons per day from their caustic scrubber. The discharge is claimed to contain a low level of toxaphene.

Riverside Chemical Company discharges approximately 12,000 gallons/day with an estimated 300 μg/1 of toxaphene in the effluent. This discharge also constitutes direct discharge to the navigable waters, but at the present time no treatment is provided.

With respect to formulators, there are approximately 133 currently active formulators with registrations for toxaphene on file with EPA. Emulsifiable concentrate and wettable powders account for about 90% of the products with the remainder accounted for by dust and oil solutions. EPA has issued a few NPDES permits to formulators discharging toxaphene.

(2) *Toxicity.* Toxic effects resulting from the presence of toxaphene in water have been documented for aquatic organisms representing a wide phylogenetic cross section and geographic distribution.

A review of published toxicity values shows that toxaphene is extremely toxic to many fish and to invertebrate species such as shrimp in marine waters and the stonefly in fresh waters. Toxaphene 96-hour LC50 values for stoneflies range from 1.3 μg/1 to 3.0 μg/1. The pink shrimp, a commercially important food organism, and the grass shrimp, an important link in the food chain, were shown to have 96-hour EC50 values of 1.4 μg/1 and 4.4 μg/1 respectively. The American oyster, which is taken for human food both commercially and recreationally, had a 96-hour EC50 of 4.9 μg/1. All of these organisms are of food chain importance and are widely distributed in fresh or marine waters.

Considerable work has been done on the effects of toxaphene on freshwater fish. Species representing those found in nearly all U.S. waters and species of both commercial and game fishing importance have been tested. Some representative 96-hour LC50 values determined in static bioassays are: largemouth bass 2 μg/1; brown trout, 3 μg/1; carp, 4 μg/; rainbow trout, 11 μg/1; coho salmon, 8 μg/1; channel catfish, 13 μg/1; fathead minnow, 5.1 μg/1; and chinook salmon, 2.5 μg/1.

The pinfish, a marine species found from Cape Cod to the Yucatan Peninsula, had a 96-hour EC50 of 0.5 μg/1 in a flow-through bioassay. Similarly the TL50 (TLm or LC50) for the striped bass has been reported as 4.4 μg/1. These fish represent an important link in the food chain for man and other consumers of aquatic life, including those within the aquatic ecosystem.

In addition to the foregoing acute toxicity data, the chronic, or long-term effects of toxaphene have been documented. For example, it has been demonstrated in flow-through bioassays that 0.28 μg/1 will, during a 128-day exposure, result in the stunting of yearling brook trout.

Toxaphene has been shown to be toxic to a variety of birds including ducks, grouse, pheasants and cranes with the LD50's being reported as 99 mg/kg; 50 mg/kg; 10 mg/kg; 100 mg/kg respectively. The chronic effects are manifested by decreased egg laying, hatchability, and food intake, and subsequent decrease in weight gains. Examples of LC50 values of toxaphene for mammalian species are: rat, 60 mg/kg; dog, 49 mg/kg; guinea pig, 270 mg/kg; cat 25 mg/kg; rabbit, 75 mg/kg.

Toxaphene has been implicated in a number of fishkills. Unusually high mortalities were observed in fish-eating birds at the Tule Lake and Lower Klamath Refuge in 1960, 1961, and 1962. The mortalities were reportedly and apparently due to application of large quantities of toxaphene for several years, starting in 1956, to the agricultural lands immediately surrounding the refuge. Water from the farmlands drains into the marshes. Toxaphene was found in the fish from the marshes at levels of about 8 ppm.

(3) *Human Health Effects.* In humans, acutely toxic doses of toxaphene produce symptoms that include salivation, spasms of the leg and back muscles, nausea, vomiting, hyperexcitability, tremors, chronic convulsions and tetanic contractions of all skeletal muscles. Most of these effects are the results of diffuse stimulation of the cerebrospinal axis. After lethal doses the convulsions continue until death occurs. Respiration is arrested due to tetanic muscular contractions.

When toxaphene was first used, four cases of poisoning by ingestion in children under 4 years of age were reported. The same report contained a description of severe toxaphene poisoning in adults from accidents or injudicious use of the pesticide. The dosage of toxaphene estimated to have been ingested by three of the people ranged from 9.5 to 47 mg/kg.

(4) *Persistence and Degradability.* Toxaphene may persist in soil from several months to more than 10 years. It has been shown to persist for up to 9 years in lakes and ponds.

(5) *Bioaccumulation.* Bioaccumulation of toxaphene has been shown to occur in a number of freshwater and marine species. In addition, toxaphene has been shown to persist in the aquatic environment for years. This poses a

latent and continuing threat to aquatic life of commercial and recreational importance. The accumulation by such widespread organisms as oysters, trout, and catfish, all of which are consumed by man, carries the threat of toxic effects directly to man.

Toxaphene has been shown to bioaccumulate in Davis Lake, Oregon, to concentrations in aquatic organisms at many times the water levels. In a study conducted there during 1961–1963 the following bioaccumulation ratios between organism tissue and water concentration were observed: 500 for aquatic plants, 1000 to 2000 for aquatic invertebrates, 10,000 to 20,000 for rainbow trout, 4000 to 8000 for Atlantic salmon and 1000 to 2000 for lake bottom and mud.

In a study using marine organisms it was demonstrated that an accumulation of as much as 30 ppm took place in oysters exposed for 24 weeks to 1 ppb of toxaphene—a concentration factor of 30,000. In the ensuing 16 weeks in clean seawater the oysters excreted 90 percent of this load, but retained 3.0 ppm in their tissues—still 3,000 times the water concentration they had been exposed to originally. The oyster is a species used for human food and is of both commercial and recreational importance.

(6) *Criteria Formulation.* The available scientific data establish that toxaphene is a powerful insecticide capable of persisting in the aquatic environment, the soil or animal tissues for long periods, capable of bioaccumulating by factors of as much as 30,000, and capable of producing chronic deleterious effects on fish at levels as low as 0.039 μg/l for brook trout and 0.055 μg/l for the fathead minnow. Since at least some aquatic organisms can readily bioaccumulate toxaphene, formulation of criteria for this pesticide in waterways must take into account the potential danger to terrestrial predators, including man, which consume that aquatic life. Moreover, many important aquatic organisms are explicitly sensitive to direct poisoning by toxaphene and must themselves be protected.

Acute toxicity has been reported at levels as low as 0.5 μg/l of toxaphene. Thus, some damage to aquatic life could be expected at higher levels. At levels of around 1.0 μg/l a large number of species are known to be affected. These include 96-hr LC50 or comparable data for stoneflies at 1.3 μg/l; the sheepshead minnow at 1.1 μg/l; the black bullhead at 1.8 μg/l; the pinfish at 0.5 μg/l; the pink shrimp at 1.4 μg/l and the spot (48-hr LC50; 1 μg/l; 144-hr LC50; 0.5 μg/l).

These data cluster between 0.5 and 1.0 μg/l. The pinfish, an organism of wide geographic distribution and of ecological importance in the food chain, has an LC50 value of 0.5 μg/l. The use of the National Academy of Sciences' application factor of 0.01 is especially appropriate in the case of toxaphene since long-term studies with fathead minnows and brook trout failed to establish a no-effect level. Application of this factor to the pinfish data yields an ambient water criterion of 0.005 μg/l.

(7) *Control Technology Available to Manufacturers and Formulators.* The only existing system at full scale for treating toxaphene manufacturing wastes is that of Hercules, Inc. MRI, using information developed by Envirogenics and Rohm and Haas Company on laboratory scale processes, has indicated that any of the resin adsorption, reductive degradation, and activated carbon systems would be transferrable to toxaphene-type wastes with a reasonable degree of confidence. It was likewise believed that the reductions achieved in full scale operation would be comparable to those achieved in the laboratory scale operations.

The available data indicates that the resin adsorption system is capable of reducing toxaphene to 1.4 μg/l and the reductive degradation system to approximately 3 μg/l. The resin adsorption and reductive degradation in series appears to reduce toxaphene to 0.1 μg/l. Activated carbon appears to reduce toxaphene to less than 5 μg/l. These data are based upon laboratory studies.

By use of controls similar to those used by aldrin/dieldrin and DDT formulators, toxaphene formulators can achieve no discharge.

(8) *Economic Impact*—(a) *Manufacturers.* Three toxaphene manufacturers are subject to the direct discharge regulations. For purposes of economic analysis the least-cost treatment system was assessed assuming that the discharger would elect to install the least-cost system. Based upon this assumption investment costs for all 3 plants total $603–776 thousand and annual operating costs $416–521 thousand. Expressed in relation to the current selling price these additional costs represent 1.1, 1.3, and 1.6–2.1 percent for Vicksburg, Riverside, and Hercules, respectively.

Although this spread suggests possible effects on the competitive structure of this industry, the results are difficult to predict given a lack of detailed information on production costs, margins, and relative market strengths of the companies involved. However, given the relatively low costs involved it seems likely that significant impact on production and use of toxaphene will be avoided by some combination of price increase and cost absorption and that intra-industry competitive effects will be minimized.

For a hypothetical new plant of 55 million pounds capacity the additional cost of compliance (based on resin adsorption and reductive degradation in series) will represent approximately 2–4 percent of selling price which may be considered an upper bound since new plants generally have less costly alternatives to end-of-pipe treatment. As with existing plants, this additional cost can presumably be accommodated with a combination of price increase and cost absorption without significant impact on production and use.

No information was available for assessing potential economic impact in regard to sources who may use this pesticide as a material in the production, preparation, or processing of another synthetic organic substance (other than formulators of this pesticide).

(b) *Formulators.* The assessment of potential economic impact for formulators was carried out for all formulators of the four pesticides together rather than separately for each pesticide. The reader is referred to the discussion of economic impact on formulators presented for aldrin/dieldrin.

(9) *Rationale for Standards.* Considering the toxicity data and the technology data set forth above, standards are proposed for existing toxaphene manufacturers of 1.5 μg/l, on the monthly average or 0.00001 kg/kkg of toxaphene produced, not to exceed 7.5 μg/l in samples repersenting any working day. For new sources innovative process changes and designs can be utilized. These include, at the least, use of resin adsorption and reductive degradation in series, as well as the option of selecting a plant site to achieve net evaporation. These factors will allow a greater margin of safety to be achieved through more stringent limitations. Hence, for new sources, the proposed standards are on a monthly average, 0.1 μg/l or 0.0000006 kg/kkg of toxaphene produced, not to exceed 0.5 μg/l in samples representing any working day.

Mass emission standards for toxaphene were calculated using the same procedures as outlined for endrin, above. The manufacturer from which the specified parameters were taken was the Hercules plant at Brunswick, Georgia, which is the largest toxaphene manufacturer, and on which considerable data are available. The average concentration used was 1.5 μg/l for existing sources and 0.1 μg/l for new sources, the flow selected was 2.4 million gpd, and the annual production was 80 million lbs of toxaphene.

For toxaphene formulators, considering the absence of any known existing direct dischargers and the demonstrated technology of evaporation ponds for new sources, a prohibition on discharge is proposed.

As in the case of endrin a more stringent limitation should be required pursuant to the provisions of § 129.7 or 129.5 (e) in the case of any individual discharger when, because of unusual site-specific circumstances, a discharge at the level prescribed in the standard will result in an ambient or chronic concentration in the receiving water, even outside of any mixing zone, in excess of the ambient water criterion. This will assure provision of the margin of safety for the ecosystem required by the Act.

III. Public Participation in Rulemaking Process

A public hearing to consider the proposed effluent standards will be held pursuant to section 307(a)(2) of the Act commencing July 12, 1976,[1] at 1:30 PM

[1] The date entered here will be 30 days following publication of this proposal. If that date falls on a Saturday, Sunday, or holiday, the date entered will be that of the previous working day.

in Room 2409, Waterside Mall at 401 M Street, SW., Washington, D.C.

In accordance with the Agency's rules of practice governing public hearings on effluent standards for toxic pollutants, 40 CFR Part 104 as amended, 41 FR 17898 (April 29, 1976), the first hearing day shall include a prehearing conference at the above time and place. All persons interested in participating in those hearings as objecting parties should refer to the amended rules of practice, and should not rely on previous editions. Any person who has any objection to any standard proposed herein may file with the Hearing Clerk (A–100), Room 1019 WSME, U.S. Environmental Protection Agency, 401 M Street, SW., Washington, D.C. 20460, within 25 days of the date of this notice, a statement of objection in triplicate which shall meet all of the requirements of 40 CFR §§ 104.3 (a) and (b). The presiding officer may refuse to permit any person to participate in said hearing who fails to comply with any of the provisions of those sections.

In addition to the foregoing, any person interested in this proposed rulemaking but who does not participate as a party in the formal hearing may submit written comments to the Agency on the proposed rulemaking. Such comments should be filed in triplicate, if possible, and should be addressed to: Hearing Clerk (A–100), Room 1019 WSME, U.S. Environmental Protection Agency, 401 M Street, S.W., Washington, D.C. 20460. All comments which are received by the hearing clerk and which are postmarked on or before July 12, 1976 shall become a part of the hearing record in the manner prescribed in 40 CFR. § 104.3(d) and shall be considered by the Administrator prior to the promulgation of final standards.

Dated: June 1, 1976.

JOHN QUARLES,
Acting Administrator.

Chapter I of Title 40, Code of Federal Regulations, is amended by revising Part 129, as follows:

PART 129—TOXIC POLLUTANT EFFLUENT STANDARDS

Subpart A—Toxic Pollutant Effluent Standards and Prohibitions

Sec.
129.1 Scope and purpose.
129.2 Definitions.
129.3 Abbreviations.
129.4 Toxic pollutants.
129.5 Compliance.
129.6 Adjustment of effluent standard for presence of toxic pollutant in the intake water.
129.7 Requirement and procedure for establishing a more stringent effluent limitation.
129.8 Compliance date.
129.9–129.99 [Reserved]
129.100 Aldrin/Dieldrin.
129.101 DDT, DDD and DDE.
129.102 Endrin.
129.103 Toxaphene.

AUTHORITY: Sec. 307, 308, and 501 of the Federal Water Pollution Control Act Amendments of 1972 (Pub. L. 92–500, 86 Stat. 816, (33 U.S.C. 1251 *et seq.*)).

Subpart A—Toxic Pollutant Effluent Standards and Prohibitions

§ 129.1 Scope and purpose.

(a) The provisions of this Subpart apply to owners or operators of specified facilities discharging into navigable waters.

(b) The effluent standards or prohibitions for toxic pollutants established in this Subpart shall be applicable to the sources and pollutants hereinafter set forth, and may be incorporated in any NPDES permit, modification or renewal thereof, in accordance with the provisions of this Subpart.

(c) The provisions of 40 CFR Parts 124 and 125 shall apply to any NPDES permit proceedings for any point source discharge containing any toxic pollutant for which a standard or prohibition is established under this Part.

§ 129.2 Definitions.

All terms not defined herein shall have the meaning given them in the Act or in 40 CFR Parts 124 or 125. As used in this Part, the term:

(a) "Act" means the Federal Water Pollution Control Act, as amended (Pub. L. 92–500, 86 Stat. 816 *et seq.*, (33 U.S.C. 1251 *et seq.*)). Specific references to sections within the Act will be according to Pub. L. 92–500 notation.

(b) "Administrator" means the Administrator of the Environmental Protection Agency or any employee of the Agency to whom the Administrator may by order delegate the authority to carry out his functions under section 307(a) of the Act, or any person who shall by operation of law be authorized to carry out such functions.

(c) "Effluent standard" means, for purposes of section 307, the equivalent of "effluent limitation" as that term is defined in section 502(11) of the Act with the exception that it does not include a schedule of compliance.

(d) "Prohibited" means that the constituent shall be absent in any discharge subject to these standards, as determined by any analytical method.

(e) "Permit" means a permit for the discharge of pollutants into navigable waters under the National Pollutant Discharge Elimination System established by section 402 of the Act and implemented in regulations in 40 CFR Parts 124 and 125.

(f) "Working day" means the hours during a calendar day in which a facility discharges effluents subject to this Part.

(g) "Ambient water criterion" means that concentration of a toxic pollutant in a navigable water that, based upon available data, will not result in adverse impact on important aquatic life, or on consumers of such aquatic life, after exposure of that aquatic life for periods of time exceeding 96 hours and continuing at least through one reproductive cycle; and will not result in a significant risk of adverse health effects in a large human population based on available information such as mammalian laboratory toxicity data, epidemiological studies of human occupational exposures, or human exposure data, or any other relevant data.

(h) "New Source" means any source discharging a toxic pollutant, the construction of which is commenced after proposal of an effluent standard or prohibition applicable to such source if such effluent standard or prohibition is thereafter promulgated in accordance with section 307.

(i) "Existing Source" means any source which is not a new source as defined above.

(j) "Source" means any building, structure, facility, or installation from which there is or may be the discharge of toxic pollutants designated as such by the Administrator under section 307(a)(1) of the Act;

(k) "Owner or operator" means any person who owns, leases, operates, controls or supervises a source as defined above.

(l) "Construction" means any placement, assembly, or installation of facilities or equipment (including contractual obligations to purchase such facilities or equipment) at the premises where such equipment will be used, including preparation work at such premises.

(m) "Manufacturer" means any establishment engaged in the mechanical or chemical transformation of materials or substances into new products including but not limited to the blending materials such as pesticidal products, resins, or liquors.

(n) "Process Wastes" means any designated toxic pollutant, whether in wastewater or otherwise present, which is inherent to or unavoidably resulting from any manufacturing process, including that which comes into direct contact with or results from the production or use of any raw material, intermediate product, finished product, by-product or waste product and is discharged into the navigable waters.

(o) "Air emissions" means the release or discharge of a toxic pollutant by an owner or operator into the ambient air either (1) by means of a stack or (2) as a fugitive dust, mist or vapor as a result inherent to the manufacturing or formulating process.

(p) "Fugitive dust, mist or vapor" means dust, mist or vapor containing a toxic pollutant regulated under this Part which is emitted from any source other than through a stack.

(q) "Stack" means any chimney, flue, conduit, or duct arranged to conduct emissions to the ambient air.

(r) "Ten year 24-hour rainfall event" means the maximum precipitation event with a probable recurrence interval of once in 10 years as defined by the National Weather Service in technical paper No. 40, "Rainfall Frequency Atlas of the United States," May 1961, and subsequent amendments or equivalent regional or State rainfall probability information developed therefrom.

(s) "State Director" means the chief administrative officer of a State or interstate water pollution control agency operating an approved NPDES permit pro-

gram. In the event responsibility for water pollution control and enforcement is divided among two or more State or interstate agencies, the term "State Director" means the administrative officer authorized to perform the particular procedure to which reference is made.

§ 129.3 Abbreviations.

The abbreviations used in this Part represent the following terms:

lb—pound (or pounds)
g—gram
μg/l—micrograms per liter (1 one-millionth gram/liter)

§ 129.4 Toxic pollutants.

The following are the pollutants subject to regulations under the provisions of this subpart:

(a) Aldrin/Dieldrin—"Aldrin" means the compound aldrin as identified by the chemical name, 1,2,3,4,10,10-hexachloro-1,4,4a,5,8,8a-hexahydro - 1,4 - endo - 5,8-exo-dimethanonaphthalene; "Dieldrin" means the compound dieldrin as identified by the chemical name 1,2,3,4,10,10-hexachloro - 6,7 - epoxy-1,4.4a,5,6,7,8,8a-octahydro - 1,4-endo-5,8-exo-dimethanonaphthalene.

(b) DDT—"DDT" means the compounds DDT, DDD, and DDE as identified by the chemical names: (DDT) - 1,1,1 - trichloro - 2,2,bis(p-chlorophenyl) ethane and some o,p'-isomers; (DDD) or (TDE) -1,1-dichloro-2,2-bis(p-chlorophenyl) ethane and some o,p'-isomers; (DDE) 1,1 - dichloro - 2,2-bis(p-chlorophenyl) ethylene.

(c) Endrin—"Endrin" means the compound endrin as identified by the chemical name 1,2,3,4,10,10-hexachloro-6,7-epoxy-1, 4,4a,5,6,7,8,8a - octahydro - 1,4-endo-5,8-endodimethanonaphthalene.

(d) Toxaphene—"Toxaphene" means a material consisting of technical grade chlorinated camphene having the approximate formula of C(10) H(10) Cl(8) and normally containing 67–69 percent chlorine by weight.

§ 129.5 Compliance.

(a) (1) Within 60 days from the date of promulgation of any toxic pollutant effluent standard or prohibition each owner or operator with a discharge subject to that standard or prohibition must notify the Regional Administrator (or State Director, if appropriate) of such discharge. Such notification shall include such information and follow such procedures as the Regional Administrator (or State Director, if appropriate) may require.

(2) Any owner or operator who does not have a discharge subject to any toxic pollutant effluent standard at the time of such promulgation but who thereafter commences or intends to commence any activity which would result in such a discharge shall first notify the Regional Administrator (or State Director, if appropriate) in the manner herein provided at least 60 days prior to any such discharge.

(b) Upon receipt of any application for issuance or reissuance of a permit or for a modification of an existing permit for a discharge subject to a toxic pollutant effluent standard or prohibition the permitting authority shall proceed thereon in accordance with 40 CFR Parts 124 or 125, whichever is applicable.

(c) (1) Every permit which contains limitations based upon a toxic pollutant effluent standard or prohibition under this Part is subject to revision following the completion of any proceeding revising such toxic pollutant effluent standard or prohibition regardless of the duration specified on the permit.

(2) For purposes of this section, all toxic pollutants for which standards are set under this Part are deemed to be injurious to human health within the meaning of section 402(k) of the Act unless otherwise specified in the standard established for any particular pollutant.

(d) (1) Upon the compliance date for any section 307(a) toxic pollutant effluent standard or prohibition, each owner or operator of a discharge subject to such standard or prohibition shall comply with such monitoring, sampling, recording, and reporting conditions as the Regional Administrator (and/or State Director, if appropriate) may require for that discharge. Notice of such conditions shall be provided in writing to the owner or operator.

(2) In addition to any conditions required pursuant to subparagraph (d) (1) of this section and to the extent not required in conditions contained in NPDES permits, within 60 days following the close of each calendar year each owner or operator of a discharge subject to any toxic standard or prohibition shall report to the Regional Administrator (and State Director, if appropriate) concerning the compliance of such discharges. Such report shall include, as a minimum, information concerning (i) relevant identification of the discharger such as name, location of facility, discharge points, receiving waters, and the industrial process or operation emitting the toxic pollutant; (ii) relevant conditions (pursuant to subparagraph (d) (1) of this section or to an NPDES permit) as to flow, section 307(a) toxic pollutant concentrations, and section 307(a) toxic pollutant mass emission rate; (iii) compliance by the discharger with such conditions.

(3) When samples collected for analysis are composited, such samples shall be composited in proportion to the flow at time of collection and preserved in compliance with requirements of the Regional Administrator (or State Director, if appropriate), but shall include at least five samples collected at approximately equal intervals throughout the working day.

(e) (1) Nothing in these regulations shall preclude a Regional Administrator from requiring in any permit a more stringent effluent limitation or standard pursuant to section 301(b) (1) (C) of the Act and implemented in 40 CFR 125.11 and other related provisions of 40 CFR Part 125.

(2) Nothing in these regulations shall preclude the Director of a State Water Pollution Control Agency or interstate agency operating a National Pollutant Discharge Elimination System Program which has been approved by the Administrator pursuant to section 402 of the Act from requiring in any permit a more stringent effluent limitation or standard pursuant to section 301(b) (1) (C) of the Act and implemented in 40 CFR 124.42 and other related provisions of 40 CFR Part 124.

(f) Any owner or operator of a facility which discharges a toxic pollutant to the navigable waters and to a publicly owned treatment system shall limit the summation of the mass emissions from both discharges to the less restrictive standard, either the direct discharge standard or the pretreatment standard; but in no case will this Subsection allow a discharge to the navigable waters greater than the toxic pollutant effluent standard established for a direct discharge to the navigable waters.

(g) In any permit hearing or other administrative proceeding relating to the implementation or enforcement of these standards, or any modification thereof, or in any judicial proceeding other than a petition for review of these standards pursuant to section 509(b) (1) (C) of the Act, the parties thereto may not contest the validity of any national standards established in this Part, or the ambient water criterion established herein for any toxic pollutant.

§ 129.6 Adjustment of effluent standard for presence of toxic pollutant in the intake water.

(a) Upon the request of the owner or operator of a facility discharging a pollutant subject to a toxic pollutant effluent standard or prohibition, the Regional Administrator (or State Director, if appropriate) shall give credit, and shall adjust the effluent standard(s) in such permit to reflect credit for the toxic pollutant(s) in the owner's or operator's water supply if (1) the source of the owner's or operator's water supply is the same body of water into which the discharge is made and if (2) it is demonstrated to the Regional Administrator (or State Director, if appropriate) that the toxic pollutant(s) present in the owner's or operator's intake water will not be removed by any wastewater treatment systems whose design capacity and operation were such as to reduce toxic pollutants to the levels required by the applicable toxic pollutant effluent standards in the absence of the toxic pollutant in the intake water.

(b) Effluent limitations established pursuant to this Section shall be calculated on the basis of the amount of Section 307(a) toxic pollutant(s) present in the water after any water supply treatment steps have been performed by or for the owner or operator.

(c) Any permit which includes toxic pollutant effluent limitations established pursuant to this Section shall also contain conditions requiring the permittee to conduct additional monitoring in the manner and locations determined by the Regional Administrator (or State Director, if appropriate) for those toxic pollutants for which the toxic pollutant effluent standards have been adjusted.

§ 129.7 Requirement and procedure for establishing a more stringent effluent limitation.

(a) In exceptional cases (1) where the Regional Administrator (or State Director, if appropriate) determines that the ambient water criterion established in these standards is not being met or will not be met in the receiving water as a result of one or more discharges at levels allowed by these standards, and (2) where he further determines that this is resulting in or may cause or contribute to significant adverse effects on aquatic or other organisms usually or potentially present, or on human health, he may issue to an owner or operator a permit or a permit modification containing a toxic pollutant effluent limitation at a more stringent level than that required by the standard set forth in these regulations. Any such action shall be taken pursuant to the procedural provisions of 40 CFR Parts 124 and 125, as appropriate. In any proceeding in connection with such action the burden of proof and of going forward with evidence with regard to such more stringent effluent limitation shall be upon the Regional Administrator (or State Director, if appropriate) as the proponent of such more stringent effluent limitation.

Evidence in such proceeding shall include at a minimum: an analysis using data and other information to demonstrate receiving water concentrations of the specified toxic pollutant, projections of the anticipated effects of the proposed modification on such receiving water concentrations, and the hydrologic and hydrographic characteristics of the receiving waters including the occurrence of dispersion of the effluent. Detailed specifications for presenting relevant information by any interested party may be prescribed in guidance documents published from time to time, whose availability will be announced in the FEDERAL REGISTER.

(b) Any effluent limitation in an NPDES permit which a State proposes to issue which is more stringent than the toxic pollutant effluent standards promulgated by the Administrator is subject to review by the Administrator under section 402(d) of the Act. The Administrator may approve or disapprove such limitation(s) or specify another limitation(s) upon review of any record of any proceedings held in connection with the permit issuance or modification and any other evidence available to him. If he takes no action within ninety days of his receipt of the notification of the action of the permit issuing authority and any record thereof, the action of the State permit issuing authority shall be deemed to be approved.

§ 129.8 Compliance date.

(a) The effluent standards or prohibitions set forth herein shall be complied with not later than one year after promulgation unless an earlier date is established by the Administrator for an industrial subcategory in the promulgation of the standards or prohibitions.

(b) Toxic pollutant effluent standards or prohibitions set forth herein shall become enforceable under Sections 307(d) and 309 of the Act on the date established in subparagraph (a) of this section regardless of proceedings in connection with the issuance of any NPDES permit or application therefor, or modification or renewal thereof.

§§ 129.9–129.99 [Reserved]

§ 129.100 Aldrin/Dieldrin.

(a) *Specialized Definitions.* (1) "Aldrin/Dieldrin Manufacturer" means a manufacturer, excluding any source which is exclusively an aldrin/dieldrin formulator, who produces, prepares or processes technical aldrin or dieldrin or who uses aldrin or dieldrin as a material in the production, preparation or processing of another synthetic organic substance.

(2) "Aldrin/Dieldrin Formulator" means a person who produces, prepares or processes a formulated product comprising a mixture of either aldrin or dieldrin and inert materials or other diluents, into a product intended for application in any use registered under the Federal Insecticide, Fungicide and Rodenticide Act, as amended (7 U.S.C. 135, et. seq.).

(3) The ambient water criterion for aldrin/dieldrin in navigable waters is 0.003 μg/l.

(b) *Aldrin/Dieldrin Manufacturer*—(1) *Applicability.* (i) These standards or prohibitions apply to:

(A) All discharges of process wastes; and

(B) All discharges from the manufacturing areas, loading and unloading areas, storage areas and other areas which are subject to direct contamination by aldrin/dieldrin as a result of the manufacturing process, including but not limited to:

(*1*) Stormwater and other runoff; and

(2) Water used for routine cleanup or cleanup of spills.

(ii) These standards do not apply to stormwater runoff or other discharges from areas subject to contamination solely by fallout from air emissions of aldrin/dieldrin; or to stormwater runoff that exceeds that from the ten year 24-hour rainfall event.

(2) *Analytical Method Acceptable.* Environmental Protection Agency method specified in 40 CFR Part 136, except that a 1-liter sample size is required to increase the analytical sensitivity.

(3) *Effluent Standard*—(i) *Existing Sources.* Aldrin or dieldrin is prohibited in any discharge from any aldrin/dieldrin manufacturer.

(ii) *New Sources.* Aldrin or dieldrin is prohibited in any discharge from any aldrin/dieldrin manufacturer.

(c) *Aldrin/Dieldrin Formulator*—(1) *Applicability.* (i) These standards or prohibitions apply to:

(A) All discharges of process wastes; and

(B) All discharges from the formulating areas, loading and unloading areas, storage areas and other areas which are subject to direct contamination by aldrin/dieldrin as a result of the formulating process, including but not limited to:

(*1*) Stormwater and other runoff; and

(2) Water used for routine cleanup or cleanup of spills.

(ii) These standards do not apply to stormwater runoff or other discharges from areas subject to contamination solely by fallout from air emissions of aldrin/dieldrin; or to stormwater runoff that exceeds that from the ten year 24-hour rainfall event.

(2) *Analytical Method Acceptable.* Environmental Protection Agency method specified in 40 CFR Part 136, except that a 1-liter sample size is required to increase the analytical sensitivity.

(3) *Effluent Standard.*—(i) *Existing Sources.* Aldrin or dieldrin is prohibited in any discharge from any aldrin/dieldrin formulator.

(ii) *New Sources.* Aldrin or dieldrin is prohibited in any discharge from any aldrin/dieldrin formulator.

§ 129.101 DDT, DDD and DDE.

(a) *Specialized Definitions.* (1) "DDT Manufacturer" means a manufacturer, excluding any source which is exclusively a DDT formulator, who produces, prepares or processes technical DDT, or who uses DDT as a material in the production, preparation or processing of another synthetic organic substance.

(2) "DDT Formulator" means a person who produces, prepares or processes a formulated product comprising a mixture of DDT and inert materials or other diluents into a product intended for application in any use registered under the Federal Insecticide, Fungicide and Rodenticide Act, as amended (7 U.S.C. 135, et seq.).

(3) The ambient water criterion for DDT in navigable waters is 0.001 μg/l.

(b) *DDT Manufacturer*—(1) *Applicability.* (i) These standards or prohibitions apply to:

(A) All discharges of process wastes; and

(B) All discharges from the manufacturing areas, loading and unloading areas, storage areas and other areas which are subject to direct contamination by DDT as a result of the manufacturing process, including but not limited to:

(*1*) Stormwater and other runoff; and

(2) Water used for routine cleanup or cleanup of spills.

(ii) These standards do not apply to stormwater runoff or other discharges from areas subject to contamination solely by fallout from air emissions of DDT; or to stormwater runoff that exceeds that from the ten year 24-hour rainfall event.

(2) *Analytical Method Acceptable.* Environmental Protection Agency method specified in 40 CFR Part 136, except that a 1-liter sample size is required to increase the analytical sensitivity.

(3) *Effluent Standard.* (i) *Existing Sources.* DDT is prohibited in any discharge from any DDT manufacturer.

(ii) *New Sources.* DDT is prohibited in any discharge from any DDT manufacturer.

(c) *DDT Formulator*—(1) *Applicability.* (i) These standards or prohibitions apply to:

(A) All discharges of process wastes; and

(B) All discharges from the formulating areas, loading and unloading areas, storage areas and other areas which are subject to direct contamination by DDT as a result of the formulating process, including but not limited to:

(*1*) Stormwater and other runoff; and

(*2*) Water used for routine cleanup or cleanup of spills.

(ii) These standards do not apply to stormwater runoff or other discharges from areas subject to contamination solely by fallout from air emissions of DDT; or to stormwater runoff that exceeds that from the ten year 24-hour rainfall event.

(2) *Analytical Method Acceptable.*—Environmental Protection Agency method specified in 40 CFR Part 136, except that a 1-liter sample size is required to increase the analytical sensitivity.

(3) *Effluent Standard*—(i) *Existing Sources.* DDT is prohibited in any discharge from any DDT formulator.

(ii) *New Sources.* DDT is prohibited in any discharge from any DDT formulator.

§ 129.102 Endrin.

(a) *Specialized Definitions.* (1) "Endrin Manufacturer" means a manufacturer, excluding any source which is exclusively an endrin formulator, who produces, prepares or processes technical endrin or who uses endrin as a material in the production, preparation or processing of another synthetic organic substance.

(2) "Endrin Formulator" means a person who produces, prepares or processes a formulated product comprising a mixture of endrin and inert materials or other diluents into a product intended for application in any use registered under the Federal Insecticide, Fungicide and Rodenticide Act, as amended (7 U.S.C. 135, et. seq.).

(3) The ambient water criterion for endrin in navigable waters is 0.004 μg/l.

(b) *Endrin Manufacturer*—(1) *Applicability.* (i) These standards or prohibitions apply to:

(A) All discharges of process wastes; and

(B) All discharges from the manufacturing areas, loading and unloading areas, storage areas and other areas which are subject to direct contamination by endrin as a result of the manufacturing process, including but not limited to:

(*1*) Stormwater and other runoff; and

(2) Water used for routine cleanup or cleanup of spills.

(ii) These standards do not apply to stormwater runoff or other discharges from areas subject to contamination solely by fallout from air emissions of endrin; or to stormwater runoff that exceeds that from the ten year 24-hour rainfall event.

(2) *Analytical Method Acceptable.* Environmental Protection Agency method specified in 40 CFR Part 136.

(3) *Effluent Standard*—(i) *Existing Sources.* Discharges from an endrin manufacturer shall not contain endrin concentrations exceeding an average per working day of 1.5 μg/l calculated over any calendar month; and shall not exceed a monthly average daily loading of 0.0003 kg/kkg of endrin produced; and shall not exceed 7.5 μg/l in a sample(s) representing any working day.

(ii) *New Sources.* Discharge from an endrin manufacturer shall not contain endrin concentrations exceeding an average per working day of 0.1 μg/l calculated over any calendar month; and shall not exceed a monthly average daily loading of 0.00002 kg/kkg of endrin produced; and shall not exceed 0.5 μg/l in a sample(s) representing any working day.

(c) *Endrin Formulator*—(1) *Applicability.* (i) These standards or prohibitions apply to:

(A) All discharges of process wastes; and

(B) All discharges from the formulating areas, loading and unloading areas, storage areas and other areas which are subject to direct contamination by endrin as a result of the formulating process, including but not limited to:

(*1*) Stormwater and other runoff; and

(2) Water used for routine cleanup or cleanup of spills.

(ii) These standards do not apply to stormwater runoff or other discharges from areas subject to contamination solely by fallout from air emissions of endrin; or to stormwater runoff that exceeds that from the ten year 24-hour rainfall event.

(2) *Analytical Method Acceptable.* Environmental Protection Agency method specified in 40 CFR Part 136, except that a 1-liter sample size is required to increase the analytical sensitivity.

(3) *Effluent Standard*—(i) *Existing Sources.* Endrin is prohibited in any discharge from any endrin formulator.

(ii) *New Sources.* Endrin is prohibited in any discharge from any endrin formulator.

(d) The standards set forth in this Section shall apply to the total combined weight or concentration of endrin, excluding any associated element or compound.

§ 129.103 Toxaphene.

(a) *Specialized Definitions.* (1) "Toxaphene Manufacturer" means a manufacturer, excluding any source which is exclusively a toxaphene formulator, who produces, prepares or processes toxaphene or who uses toxaphene as a material in the production, preparation or processing of another synthetic organic substance.

(2) "Toxaphene Formulator" means a person who produces, prepares or processes a formulated product comprising a mixture of toxaphene and inert materials or other diluents into a product intended for application in any use registered under the Federal Insecticide, Fungicide and Rodenticide Act, as amended (7 U.S.C. 135, et seq.).

(3) The ambient water criterion for toxaphene in navigable waters is 0.005 μg/l.

(b) *Toxaphene Manufacturer*—(1) *Applicability.* (i) These standards or prohibitions apply to:

(A) All discharges of process wastes; and

(B) All discharges from the manufacturing areas, loading and unloading areas, storage areas and other areas which are subject to direct contamination by toxaphene as a result of the manufacturing process, including but not limited to:

(*1*) Stormwater and other runoff; and

(2) Water used for routine cleanup or or cleanup of spills.

(ii) These standards do not apply to stormwater runoff or other discharges from areas subject to contamination solely by fallout from air emissions of toxaphene; or to stormwater runoff that exceeds that from the ten year 24-hour rainfall event.

(2) *Analytical Method Acceptable.*—Environmental Protection Agency method specified in 40 CFR Part 136.

(3) *Effluent Standard*—(i) Existing *Sources.*—Discharges from a toxaphene manufacturer shall not contain toxaphene concentrations exceeding an average per working day of 1.5 μg/l calculated over any calendar month; and shall not exceed a monthly average daily loading of 0.00001 kg/kkg of toxaphene produced, and shall not exceed 7.5 μg/l in a sample(s) representing any working day.

(ii) *New Sources.*—Discharges from a toxaphene manufacturer shall not contain toxaphene concentrations exceeding an average per working day of 0.1 μg/l calculated over any calendar month; and shall not exceed a monthly average daily loading of 0.0000006 kg/kkg of toxaphene produced, and shall not exceed 0.5 μμg/l in a sample(s) representing any working day.

(c) *Toxaphene Formulator*—(1) *Applicability.* (i) These standards or prohibitions apply to:

(A) All discharges of process wastes; and

(B) All discharges from the formulating areas, loading and unloading areas, storage areas and other areas which are subject to direct contamination by toxaphene as a result of the formulating process, including but not limited to:

(*1*) Stormwater and other runoff; and

(2) Water used for routine cleanup or cleanup of spills.

(ii) These standards do not apply to stormwater runoff or other discharges from areas subject to contamination solely by fallout from air emissions of toxaphene; or to stormwater runoff that

exceeds that from the ten year 24-hour rainfall event.

(2) *Analytical Method Acceptable.* Environmental Protection Agency method specified in 40 CFR Part 136, except that a 1-liter sample size is required to increase the analytical sensitivity.

(3) *Effluent Standards*—(i) *Existing Sources.* Toxaphene is prohibited in any discharge from any toxaphene formulator.

(ii) *New Sources.* Toxaphene is prohibited in any discharge from any toxaphene formulator.

(d) The standards set forth in this Section shall apply to the total combined weight or concentration of toxaphene, excluding any associated element or compound.

[FR Doc.76-16741 Filed 6-9-76;8:45 am]